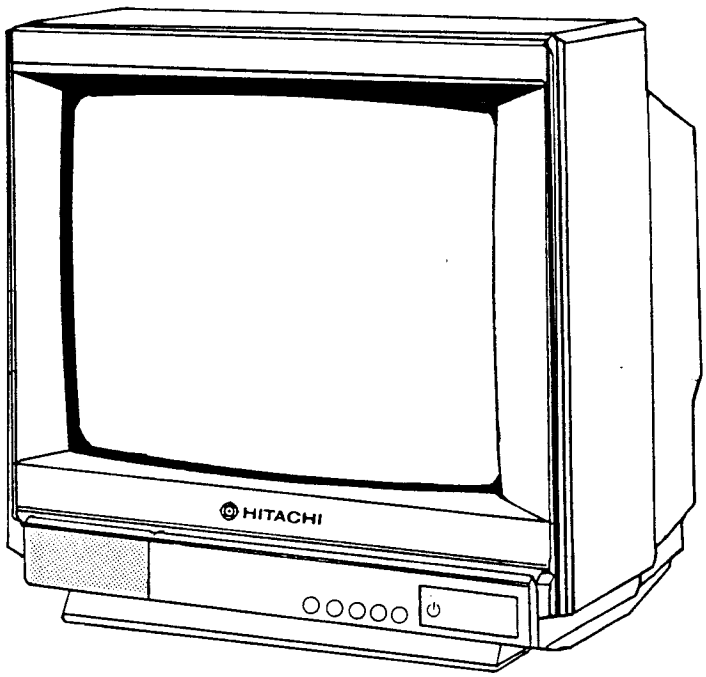
HITACHI

C1709T

SERVICE MANUAL SUPPLEMENT

CAUTION:
Before servicing this chassis, it is important that the service technician read the "Safety Precaution" and "Product Safety Notices" in this service manual supplement.



TECHNICAL SPECIFICATIONS

TV standard	625-line single standard
Channel coverage	UHF channels 21-68
Aerial input impedance	75 ohm unbalanced
Intermediate frequencies	
I.F. Luminance	39.5MHz
I.F. Sound	33.5MHz
I.F. Chrominance	35.07MHz
F.M. Sound	6.0MHz
Colour subcarrier	4.43MHz
Focusing	Electro static
Mains voltage	240V-50Hz
Fuses	T2.5A
Picture tubes	A41 EAM00X01
Programme Selectors	Channel up/down buttons with 30 programme remote control
Speaker	7.5cm 8 ohm
Sound output	1W RMS
Power consumption	72W approx.
Dimensions:	
Width	410mm
Height	400mm
Depth	395mm
Weight	13kgs approx.

- Since this is a basic circuit, the value of the parts and specifications are subject to be altered for improvement.

Use this supplement in conjunction with service manual C2118R/C2118T part No. X830645.

1991

SAFETY PRECAUTIONS

WARNING: The following precautions should be observed.

1. Do not install, remove, or handle the picture tube in any manner unless shatter proof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep the picture tube away from the body while handling.
2. When service is required, an isolation transformer should be inserted between power line and the receiver before any service is performed on the chassis.
3. When replacing the chassis in the cabinet, ensure all the protective devices are put back in place, such as barriers, non-metallic knobs, adjustment or compartment covers or shields, isolation resistors/capacitors, etc.
4. When service is required, observe the original lead dressing. Extra precaution should be taken to assure correct lead dressing in the high voltage circuitry area. Particularly note the R.G.B. lead dressing. Ensure they are dressed well away from the horizontal scan and F.B.T. circuitry.
5. Always use the manufacturer's replacement component. Always replace original spacers and maintain lead lengths. Especially critical components are indicated thus ⚠ on the parts list and should not be replaced by other makes. Furthermore, where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective, or inadvertently damaged during servicing.
   Therefore, the following checks are recommended for the continued protection of the customers and service technicians.

INSULATION

Insulation resistance should not be less than 10MΩ at 500V DC between the mains poles and any accessible metal parts.
Also, no flashover or breakdown should occur during the dielectric strength test, applying 3kV AC or 4.25kV DC for two seconds between the main poles and accessible metal parts.

HIGH VOLTAGE

High voltage should always be kept at the rated value of the chassis and no higher. Operating at higher voltages may cause a failure of the picture tube or high voltage supply, and also, under certain circumstances could produce X-radiation moderately in excess of design levels. The high voltage must not, under any circumstances, exceed 27kV on the chassis.

X-RADIATION

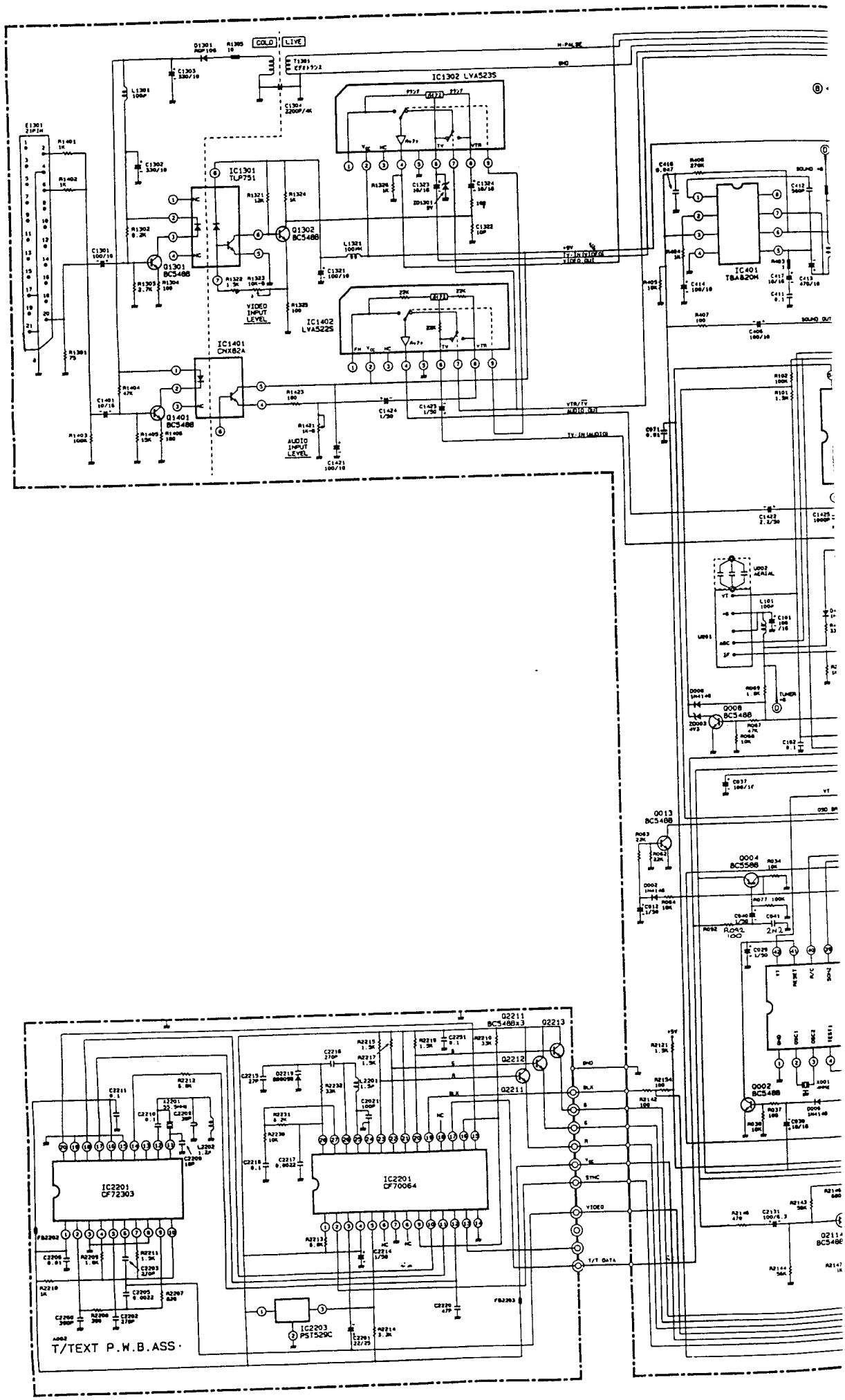
TUBES: The primary source of X-radiation in this receiver is the picture tube. The tube utilised for the above mentioned function in this chassis is specially constructed to limit X-radiation.
For continued X-radiation protection, replace tube with the same type as the original HITACHI approved type.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in HITACHI television receivers have special safety related characteristics. These characteristics are often not evident from visual inspection, nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified by marking with a ⚠ on the schematics and replacement parts list in this Service Manual.
The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create electrical shock, fire, X-radiation, or other hazards.
Product Safety is continuously under review, and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of HITACHI Service Manuals, may be obtained at a nominal charge from your HITACHI SALES CORPORATION.

TUBE DISCHARGE

The line output stage can develop voltages in excess of 25kV; if the E.H.T. cap is required to be removed, discharge the anode cap to chassis via a high value resistor, prior to its removal from the tube.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Q1301 BC5488
IC1402 LVA522S
IC1401 CNX82A
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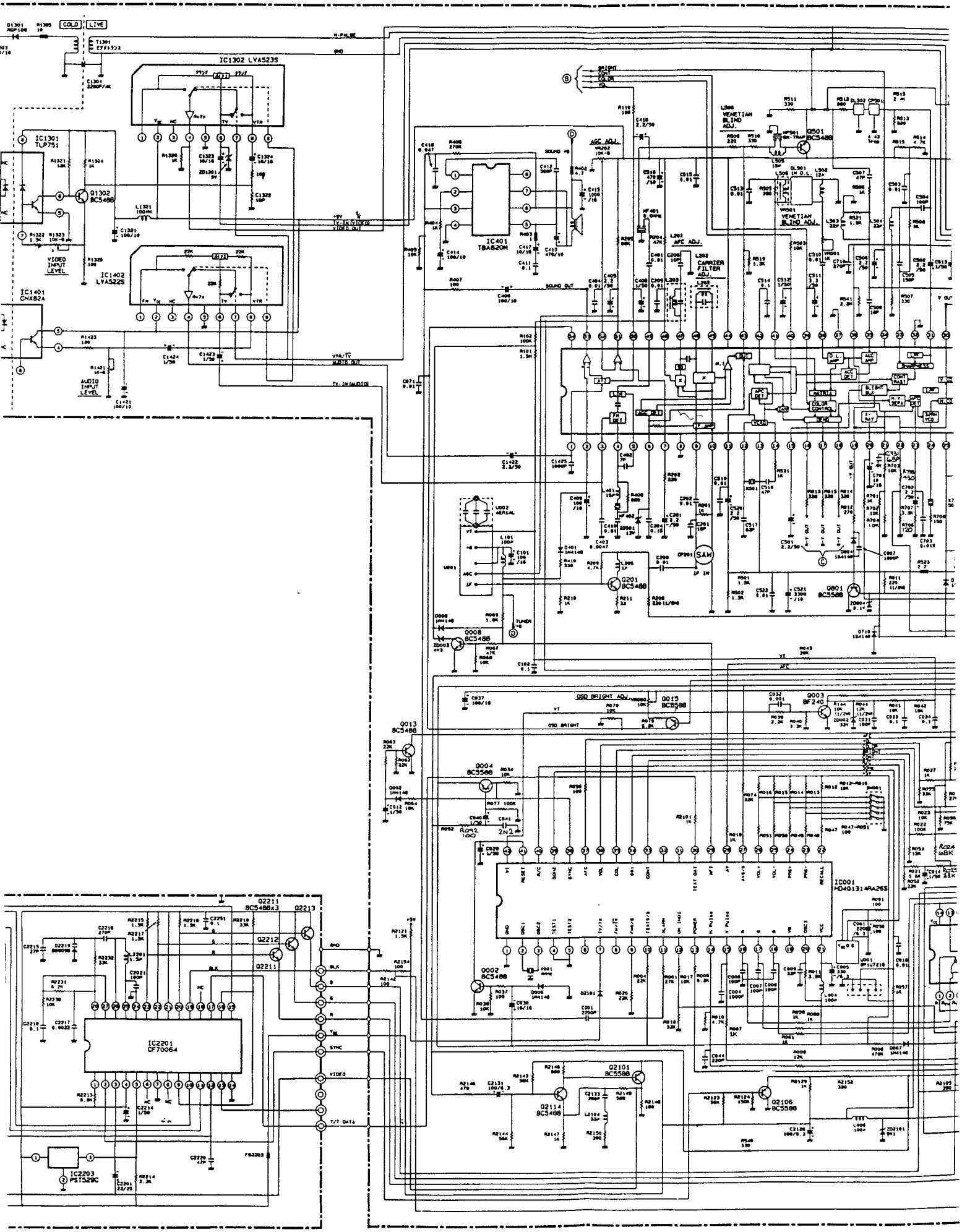
IC1401 TBA820M
Q013 BC5488
Q004 BC5586
Q002 BC5488
Q008 BC5488
Q2211 BC5488x3
Q2213
Q2212
Q2211
IC2201 CF72303
IC2201 CF70064
IC2203 PST529C
T/TEXT P.W.B.ASS'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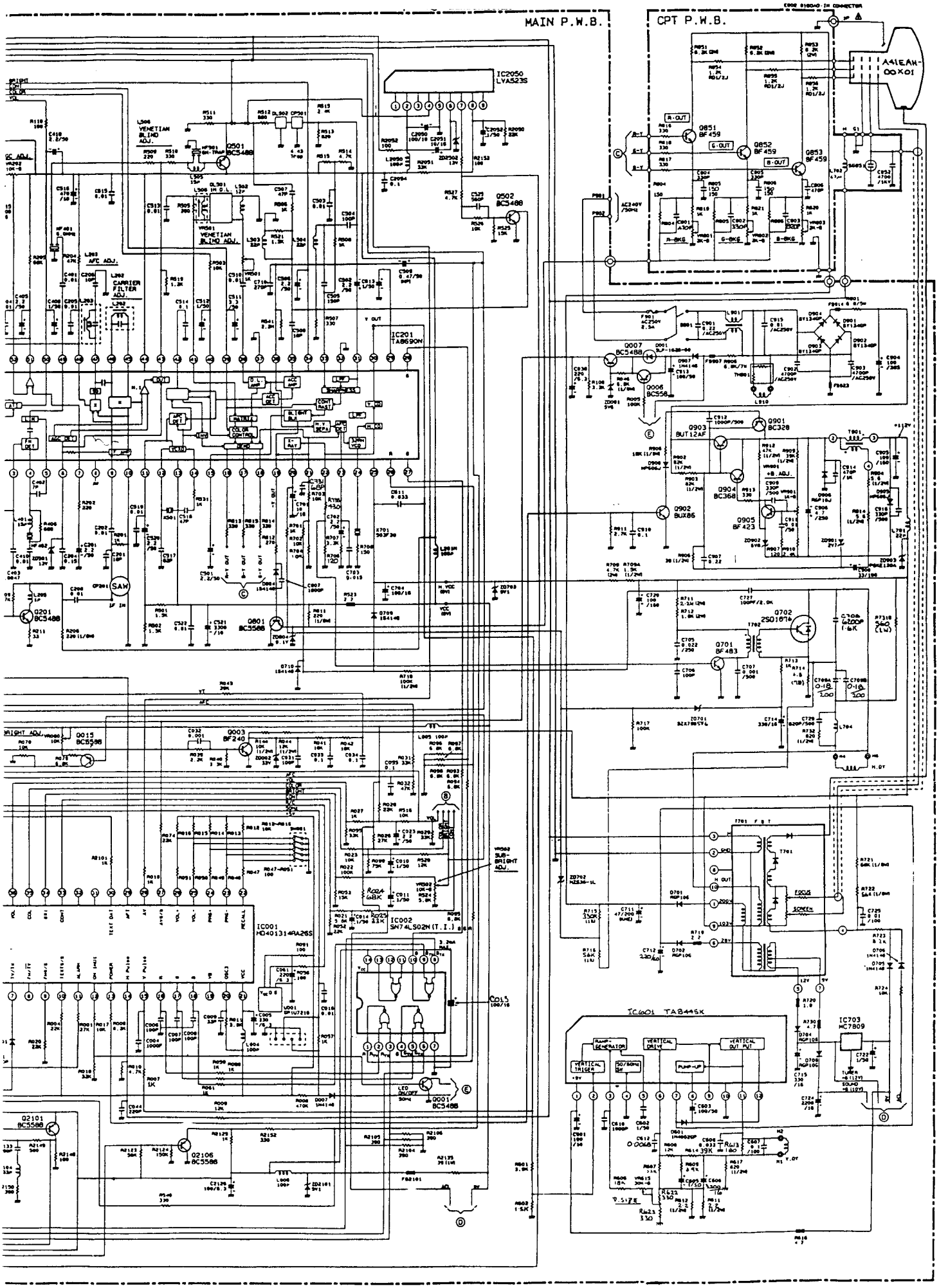
IC1402 LVA522S
IC1401 CNX82A
IC401 TBA820M
IC1001 HD401314RA26S
IC2201 CF70064
IC2203 PST529C
Q1302 BC548B
Q501 BC548B
Q201 BC548B
Q801 BC558B
Q008 BC548B
Q013 BC548B
Q004 BC558B
Q002 BC548B
Q015 BC558B
Q003 BF240
Q2211 BC548Bx3
Q2213
Q2212
Q2211
Q2101 BC558B
Q2114 BC548B
Q2106 BC558B
COLD
LIVE
H-PULSE
PHO
+9V
TV-IN(Y/CVBS) VIDEO OUT
SOUND OUT
VTR/TV AUDIO OUT
TV-IN AUDIO
VIDEO INPUT LEVEL
AUDIO INPUT LEVEL
AGC ADJ.
AFC ADJ.
CARRIER FILTER ADJ.
VENETIAN BLIND ADJ.
OSD BRIGHT ADJ.
SAW
TUNER
AERIAL
BLK
VIDEO
T/T DATA


MAIN P.W.B.
CPT P.W.B.
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IC201 TA8690N
IC001 HD401314RA26S
IC002 SN74LS02N (T.I.)
IC601 TA8445K
IC703 MC7809
Q501 BC548B
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Q851 BF459
Q852 BF459
Q853 BF459
Q007 BC548B
Q006 BC556
Q901 BC328
Q903 BUT12AF
Q904 BC368
Q902 BUX86
Q905 BF423
Q702 2SD1016
Q701 BF483
Q201 BC548B
Q601 BC556B
Q003 BF240
Q015 BC558B
Q001 BC548B
Q2101 BC558B
Q2106 BC558B
R-OUT
G-OUT
B-OUT
VENETIAN BLIND ADJ.
CARRIER FILTER ADJ.
AFC ADJ.
SUB-BRIGHT ADJ.
FOCUS
SCREEN
VERTICAL OUTPUT
VERTICAL DRIVE
RAMP GENERATOR
PUMP-UP
50/60Hz

ISSUE 5
4
OSD-BRIGHT
H.PHASE
SUB.BRIGHT
CAUTION LIVE PART
LIVE PART
PAL DECORDER
DL.GAIN
AGC
(BROWN)
(BLUE)
T2.5A
SW001
IC001
IC2050
IC1302
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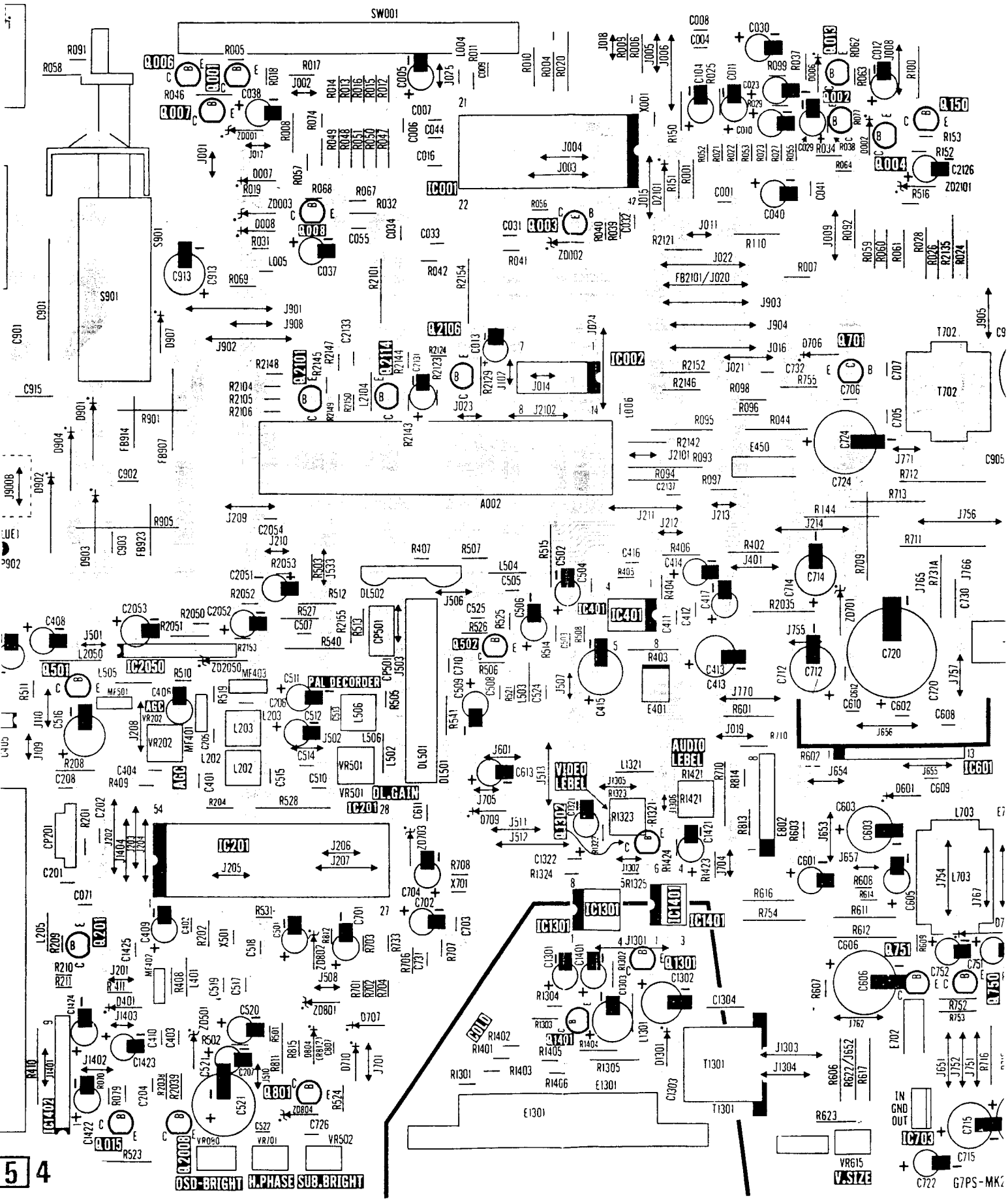
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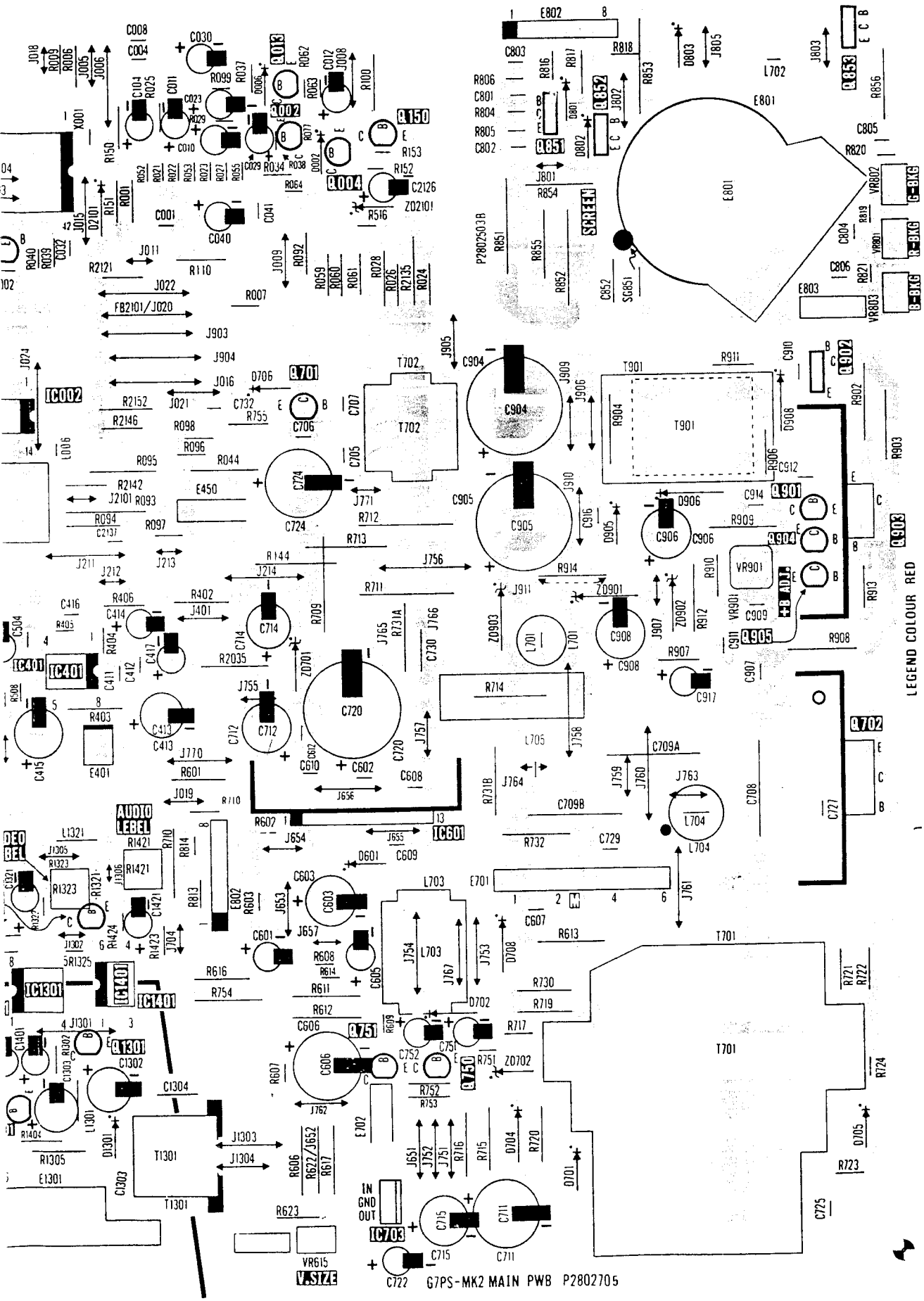
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Resistor Abbreviation	Type
CF	Carbon Film
MO	Metal Oxide
FF	Fusible Film
VR	Variable Control
MF	Metal Film
WW	Wire Wound

Capacitor Abbreviation	Type
C	Ceramic
PF	Plastic Film
FT	Feed Through
MPO	Met. Polyester
MPS	Mica/Polystyrene
MP	Metallised Paper
TA	Tantalum

Ref No.	Part No.	Value	Type	Tol %	Wattage
R001	0700059M	27K	CF	5	1/16
R004	0700058M	22K	CF	5	1/16
R005	0700067M	100K	CF	5	1/16
R006	0700053M	8K2	CF	5	1/16
R007	0700041M	1K0	CF	5	1/16
R008	R457330	470K	CF	5	1/4
R009	0700055M	12K	CF	5	1/16
R010	0700049M	4K7	CF	5	1/16
R011	0700048M	3K9	CF	5	1/16
R012-17	0700054M	10K	CF	5	1/16
R018	0700061M	33K	CF	5	1/16
R019	0700041M	1K0	CF	5	1/16
R020	0700058M	22K	CF	5	1/16
R021	0700051M	5K6	CF	5	1/16
R022	0700067M	100K	CF	5	1/16
R023	0700054M	10K	CF	5	1/16
R024	0700065M	68K	CF	5	1/16
R025	0700061M	33K	CF	5	1/16
R026	0700059M	27K	CF	5	1/16
R027	0700041M	1K0	CF	5	1/16
R028	0700058M	22K	CF	5	1/16
R029	0700061M	33K	CF	5	1/16
R031	0700061M	33K	CF	5	1/16
R032	0700063M	47K	CF	5	1/16
R034	0700054M	10K	CF	5	1/16
R037	0700027M	100R	CF	5	1/16
R038	0700054M	10K	CF	5	1/16
R039	0700045M	2K2	CF	5	1/16
R040	0700047M	3K3	CF	5	1/16
R041	0700057M	18K	CF	5	1/16
R042	0700057M	18K	CF	5	1/16
R043	0700062M	39K	CF	5	1/16
R044	R142319	12K	CF	5	1/2
R046	0700052M	6K8	CF	5	1/16
R047-51	0700027M	100R	CF	5	1/16
R052	0700058M	22K	CF	5	1/16
R053	0700056M	15K	CF	5	1/16
R055	0700061M	33K	CF	5	1/16
R056	0700027M	100R	CF	5	1/16
R057	0700041M	1K0	CF	5	1/16
R058	0700027M	100R	CF	5	1/16
R059	0700041M	1K0	CF	5	1/16
R060	0700041M	1K0	CF	5	1/16
R061	0700041M	1K0	CF	5	1/16
R067	0700063M	47K	CF	5	1/16
R068	0700054M	10K	CF	5	1/16
R069	0700043M	1K5	CF	5	1/16
R070	0700054M	10K	CF	5	1/16
R074	0700058M	22K	CF	5	1/16
R077	0700067M	100K	CF	5	1/16
R079	0700052M	6K8	CF	5	1/16
VR080	0160225	10K	VR	ON-SCREEN	BRIGHTNESS
R091	0700027M	100R	CF	5	1/16
R092	0700027M	100R	CF	5	1/16
R093-98	0700052M	6K8	CF	5	1/16
R099	0187110M	75K	CF	5	1/16
R100	0700047M	3K3	CF	5	1/16
R101	R262716	2M2	MF	5	1/4
R102	0700067M	100K	CF	5	1/16
R110	0700027M	100R	CF	5	1/16
R144	R140319	10K	CF	5	1/2

Ref No.	Part No.	Value	Type	Tol %	Wattage
R201	0700041M	1K0	CF	5	1/16
VR202	0160215	10K	VR	HORIZ.	OSCILLATOR
R202	0700032M	220R	CF	5	1/16
R204	0700063M	47K	CF	5	1/16
R205	0700065M	68K	CF	5	1/16
R208	R222330	220R	CF	5	1/4
R209	0700049M	4K7	CF	5	1/16
R210	0700041M	1K0	CF	5	1/16
R211	0700021M	33R	CF	5	1/16
⚠ R402	0119687S	4R7	FF	5	1/4
⚠ R403	0119512S	1R0	FF	5	1/4
R404	0700038M	680R	CF	5	1/16
R405	0700054M	10K	CF	5	1/16
R406	R257330	270K	CF	5	1/4
R407	0700027M	100R	CF	5	1/16
R408	0700046M	2K7	CF	5	1/16
R409	0700046M	2K7	CF	5	1/16
R411	0700054M	10K	CF	5	1/16
R412	R447330	47K	CF	5	1/4
VR501	0160211	1K0	VR	DELAY	LINE PHASE
R501	0700043M	1K5	CF	5	1/16
VR502	0160225	10K	VR	SUB.	BRIGHTNESS
R502	0700043M	1K5	CF	5	1/16
R503	0700054M	10K	CF	5	1/16
R505	0700035M	390R	CF	5	1/16
R506	0700041M	1K0	CF	5	1/16
R507	0700034M	330R	CF	5	1/16
R508	0700041M	1K0	CF	5	1/16
R510	0700033M	270R	CF	5	1/16
R511	0700034M	330R	CF	5	1/16
R512	0700038M	680R	CF	5	1/16
R513	0700039M	820R	CF	5	1/16
R514	0700049M	4K7	CF	5	1/16
R515	R234330	2K4	CF	5	1/16
R516	0700054M	10K	CF	5	1/16
R519	0700042M	1K2	CF	5	1/16
R521	0700043M	1K5	CF	5	1/16
⚠ R523	0119505S	2R2	FF	5	1/4
R524	0700051M	5K6	CF	5	1/16
R525	0700056M	15K	CF	5	1/16
R526	0700054M	10K	CF	5	1/16
R527	0700049M	4K7	CF	5	1/16
R528	0700055M	12K	CF	5	1/16
R531	0700042M	1K2	CF	5	1/16
R541	R262716	2M2	MF	5	1/4
R601	0700048M	3K9	CF	5	1/16
R602	0700043M	1K5	CF	5	1/16
R606	0700057M	18K	CF	5	1/16
R607	0700058M	22K	CF	5	1/16
R608	0700055M	12K	CF	5	1/16
R609	0700048M	3K9	CF	5	1/16
R611	R202319	2R2	CF	5	1/2
R612	R202319	2R2	CF	5	1/2
R613	R128319	180R	CF	5	1/2
R614	0700062M	39K	CF	5	1/16
VR615	0160226	20K	VR	HEIGHT	CONTROL
⚠ R616	0119687S	4R7	FF	5	1/4
R622	0700034M	330R	CF	5	1/16
R623	0700034M	330R	CF	5	1/16
R701	0700041M	1K0	CF	5	1/16
R702	0700054M	10K	CF	5	1/16

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Ref No.	Part No.	Value	Type	Tol %	Wattage
R703	0700054M	10K	CF	5	1/16
R704	0700054M	10K	CF	5	1/16
R706	0700028M	120R	CF	5	1/16
R707	0700047M	3K3	CF	5	1/16
R708	0700029M	150R	CF	5	1/16
R709	0110261S	4K7	MO	5	2
R709A	R135319	1K5	CF	5	1/2
R710	R150319	100K	CF	5	1/2
R711	0110253S	2K2	MO	5	2
R712	0110251S	1K8	MO	5	2
R713	0700041M	1K0	CF	5	1/16
R714	0147630	6R8	WW	10	7
R715	R353721	330K	MF	1	1/4
R716	R546721	56K	MF	1	1/4
R717	0700067M	100K	CF	5	1/16
⚠ R719	0119505S	2R2	FF	5	1/4
⚠ R720	0119512S	1R0	FF	5	1/4
R721	R648330	68K	CF	5	1/4
R722	R546330	56K	CF	5	1/4
R723	0700053M	8K2	CF	5	1/16
R724	R140330	10K	CF	5	1/4
⚠ R730	0119687S	4R7	FF	5	1/4
R731B	0110139S	560R	MO	5	1
R732	R822319	820R	CF	5	1/2
R733	0187056M	430R	CF	5	1/16
VR801	0160222	2K0	VR	RED	BACKGROUND
VR802	0160222	2K0	VR	GREEN	BACKGROUND
VR803	0160222	2K0	VR	BLUE	BACKGROUND
R804	0700029M	150R	CF	5	1/16
R805	0700029M	150R	CF	5	1/16
R806	0700029M	150R	CF	5	1/16
R811	R222330	220R	CF	5	1/4
R812	0700027M	100R	CF	5	1/16
R813-18	0187038M	75R	CF	5	1/16
R819	0700041M	1K0	CF	5	1/16
R820	0700041M	1K0	CF	5	1/16
R821	0700041M	1K0	CF	5	1/16
R851	0110269S	10K	MO	5	2
R852	0110269S	10K	MO	5	2
R853	0110269S	10K	MO	5	2
R854	R132319	1K2	CF	5	1/2
R855	R132319	1K2	CF	5	1/2
R856	R132319	1K2	CF	5	1/2
VR901	0160211	1K0	VR	H.T.	PRESET
R901	0144009	6R8	WW	5	5
R902	R842319	82K	CF	5	1/2
R903	R842319	82K	CF	5	1/2
R904	R506319	5R6	CF	5	1/2
R905	0145045	6K8	WW	5	7
R906	R148330	18K	CF	5	1/4
R907	R122330	120R	CF	5	1/4
R908	R319319	39R	CF	5	1/2
R909	R349319	39K	CF	5	1/2
R910	R237330	2K7	CF	5	1/4
R911	R237330	2K7	CF	5	1/4
R912	R447319	47K	CF	5	1/2
R913	R227330	270R	CF	5	1/4
R914	R506319	5R6	CF	5	1/2
R1301	0187038M	75R	CF	5	1/16
R1302	0700053M	8K2	CF	5	1/16
R1303	0700046M	2K7	CF	5	1/16
R1304	0700027M	100R	CF	5	1/16
⚠ R1305	0119514S	10R	FF	5	1/4
R1321	0700055M	12K	CF	5	1/16
R1322	0700043M	1K5	CF	5	1/16
R1323	0160215	10K	VR	VIDEO	AMP CONTROL
R1324	0700041M	1K0	CF	5	1/16
R1325	0700027M	100R	CF	5	1/16
R1326	0700041M	1K0	CF	5	1/16
R1390	0700027M	1K0	CF	5	1/16
R1401	0700041M	1K0	CF	5	1/16
R1402	0700041M	1K0	CF	5	1/16
R1403	0700067M	100K	CF	5	1/16
R1404	0700063M	47K	CF	5	1/16
R1405	0700056M	15K	CF	5	1/16
R1406	0700031M	180R	CF	5	1/16

Ref No.	Part No.	Value	Type	Tol %	Wattage
R1421	0160211	1K0	VR	AUDIO	GAIN CONTROL
R1423	0700031M	180R	CF	5	1/16
R1424	0700065M	68K	CF	5	1/16
R2050	0700058M	22K	CF	5	1/16
R2051	0700061M	33K	CF	5	1/16
R2052	0700027M	100R	CF	5	1/16
R2101	0700041M	1K0	CF	5	1/16
R2104	0700035M	390R	CF	5	1/16
R2105	0700035M	390R	CF	5	1/16
R2106	0700035M	390R	CF	5	1/16
R2121	0700043M	1K5	CF	5	1/16
R2123	0700064M	56K	CF	5	1/16
R2124	0700069M	150K	CF	5	1/16
R2129	0700041M	1K0	CF	5	1/16
R2135	0110111S	39R	MO	5	1
R2142	0700027M	100R	CF	5	1/16
R2143	0700064M	56K	CF	5	1/16
R2144	0700064M	56K	CF	5	1/16
R2145	0700038M	680R	CF	5	1/16
R2146	0700036M	470R	CF	5	1/16
R2147	0700041M	1K0	CF	5	1/16
R2148	0700031M	180R	CF	5	1/16
R2149	0700038M	680R	CF	5	1/16
R2150	0700035M	390R	CF	5	1/16
R2152	0700034M	330R	CF	5	1/16
R2153	0700027M	100R	CF	5	1/16
R2154	0700027M	100R	CF	5	1/16
R2155	0700034M	330R	CF	5	1/16
R2207	0700039M	820R	CF	5	1/16
R2208	0700035M	390R	CF	5	1/16
R2209	0700043M	1K5	CF	5	1/16
R2210	0700041M	1K0	CF	5	1/16
R2211	0700043M	1K5	CF	5	1/16
R2212	0700052M	6K8	CF	5	1/16
R2213	0700052M	6K8	CF	5	1/16
R2214	0700047M	3K3	CF	5	1/16
R2115	0700043M	1K5	CF	5	1/16
R2117	0700043M	1K5	CF	5	1/16
R2119	0700043M	1K5	CF	5	1/16
R2230	0700054M	10K	CF	5	1/16
R2231	0700053M	8K2	CF	5	1/16
R2232	0700061M	33K	CF	5	1/16
R2240	0700061M	33K	CF	5	1/16

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Ref No.	Part No.	Value	Type	Tol %	Voltage
C001	0890092R	2n2	C	10	50
C004	0890087R	1n0	C	-	50
C005	0800064R	330u	EL	-	6V3
C006	0890074R	100p	C	5	50
C007	0890074R	100p	C	5	50
C008	0890074R	100p	C	5	50
C009	0890121R	33p	C	5	50
C010	0800003R	1u0	EL	-	50
C011	0800003R	1u0	EL	-	50
C013	0800047R	100u	EL	-	6V3
C014	0800003R	1u0	EL	-	50
C016	0880044R	10n	PF	10	50
C023	0800005R	2u2	EL	-	50
C029	0800003R	1u0	EL	-	50
C030	0800015R	10u	EL	-	16
C031	0246464R	100p	C	5	50
C032	0890087R	1n0	C	-	50
C033	0880057R	100n	PF	10	50
C034	0880057R	100n	PF	10	50
C037	0800048R	100u	EL	-	10
C038	0800056R	220u	EL	-	6V3
C040	0800003R	1u0	EL	-	50
C041	0890092R	2n2	C	5	50
C044	0890078R	220p	C	10	50
C055	0880057R	100n	PF	10	50
C061	0800056R	220u	EL	-	6V3
C071	0880044R	10n	PF	10	50
C101	0800049R	100u	EL	-	16
C102	0880057R	100n	PF	10	50
C201	0890064R	18p	C	5	50
C202	0880044R	10n	PF	10	50
C204	0880059R	150n	PF	10	50
C205	0880044R	10n	PF	10	50
C206	0890114R	10p	C	-	50
C207	0800005R	2u2	EL	-	50
C208	0244171R	10n	C	10	50
C401	0880044R	10n	PF	10	50
C402	0890117R	18p	C	5	50
C403	0890097R	5n6	C	20	50
C404	0880044R	10n	PF	10	50
C405	0800005R	2u2	EL	-	50
C406	0800048R	100u	EL	-	10
C409	0800022R	22u	EL	-	10
C410	0244171R	10n	C	10	50
C411	0880057R	100n	PF	10	50
C412	0890084R	560p	C	10	50
C413	0800073R	470u	EL	-	10
C414	0800015R	10u	EL	-	16
C415	0800082	1000u	EL	-	16
C416	0880053R	47n	PF	10	63
C417	0800015R	10u	EL	-	16
C418	0800005R	2u2	EL	-	50
C501	0800005R	2u2	EL	-	50
C502	0800005R	2u2	EL	-	50
C503	0880044R	10n	PF	10	50
C504	0890074R	100p	C	5	50
C505	0890076R	150p	C	10	50
C506	0800005R	2u2	EL	-	50
C507	0890123R	47p	C	5	50
C508	0890117R	18p	C	5	50
C509	0800001R	0u47	EL	-	50
C510	0880044R	10n	PF	10	50
C511	0800015R	10u	EL	-	16
C512	0800003R	1u0	EL	-	50
C513	0880044R	10n	PF	10	50
C514	0880057R	100n	PF	10	50
C515	0880044R	10p	PF	10	50
C516	0800073R	470u	EL	-	10
C517	0890074R	100p	C	5	50
C518	0890121R	33p	C	5	50
C519	0880044R	10n	PF	10	50
C520	0800005R	2u2	EL	-	50
C521	0800089	3300u	EL	-	10
C522	0880044R	10n	PF	10	50
C525	0890084R	560p	C	10	50
C601	0800048R	100u	EL	-	10

Ref No.	Part No.	Value	Type	Tol %	Voltage
C602	0276729	1u0	PF	5	50
C603	0800053R	100u	EL	-	50
C605	0800003R	1u0	EL	-	50
C606	0800087	2200u	EL	-	16
C607	0279693R	100n	PF	10	100
C610	0890087R	1n0	C	-	50
C611	0880051R	33n	PF	10	50
C612	0880042R	6n8	PF	10	50
C613	0800003R	1u0	EL	-	50
C701	0800015R	10u	EL	-	16
C702	0800005R	2u2	EL	-	50
C703	0880046R	15n	PF	10	50
C704	0800049R	100u	EL	-	16
C705	C242710	22n	MPO	10	250
C706	0890074R	100p	C	5	50
C707	0244501R	1n0	C	10	500
C708	0299732	6n2	PF	5	1K6
C709A	0299929	180n	PF	10	200
C709B	0299929	180n	PF	10	200
C710	0890079R	270p	C	10	50
C711	0255031	47u	EL	-	200
C712	0800062	220u	EL	-	50
C714	0800066R	330u	EL	-	16
C715	0800066R	330u	EL	-	16
C720	0259152	100u	EL	-	160
C722	0800003R	1u0	EL	-	50
C724	0800087	2200u	EL	-	16
C725	0279687R	10n	PF	10	100
C727	0246344	2n0	C	-	100
C729	0243512R	820p	C	10	500
C731	0890072R	68p	C	-	50
C801	0890083R	470p	C	10	50
C802	0890081R	330p	C	10	50
C803	0890086R	820p	C	10	50
C804	0890081R	330p	C	10	50
C805	0890081R	330p	C	10	50
C806	0890083R	470p	C	10	50
C810	0890074R	100p	C	5	50
C811	0890074R	100p	C	5	50
C812	0890074R	100p	C	5	50
C852	0245612	4n7	C	10	1K0
C901	0279698	220n	PF	20	250
⚠ C902	0249395	4n7	C	10	500
⚠ C903	0249395	4n7	C	10	500
C904	0284231	100u	EL	-	385
C905	0253960	100u	EL	-	160
C906	0253971	4u7	EL	-	250
C907	0880062R	220n	PF	10	50
C908	0800037	33u	EL	-	100
C909	0243507R	330p	C	10	500
C910	0880016R	100n	PF	10	50
C911	C333715	3n3	MPO	10	63
C912	0244501R	1n0	C	10	500
C913	0800053R	100u	EL	-	50
C914	0245605	470p	C	10	1K0
⚠ C915	0249396	10n	C	10	500
C916	0243507R	330p	C	10	500
C1301	0800048R	100u	EL	-	10
C1302	0800065R	330u	EL	-	10
C1303	0800065R	330u	EL	-	10
⚠ C1304	0247974	2n2	C	-	4K0
C1321	0800048R	100u	EL	-	10
C1322	0890114R	10p	C	-	50
C1323	0800015R	10u	EL	-	16
C1324	0800003R	1u0	EL	-	50
C1401	0800015R	10u	EL	-	16
C1421	0800048R	100u	EL	-	10
C1422	0800005R	2u2	EL	-	50
C1423	0800003R	1u0	EL	-	50
C1424	0800003R	1u0	EL	-	50
C1425	0890087R	1n0	C	-	50
C2050	0800048R	100u	EL	-	10
C2051	0800015R	10u	EL	-	16
C2052	0800003R	1u0	EL	-	50
C2053	0800048R	100u	EL	-	10
C2054	0880057R	100n	PF	10	50

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Ref No.	Part No.	Value	Type	Tol %	Voltage
C2126	0800047R	100u	EL	-	6V3
C2131	0800047R	100u	EL	-	6V3
C2133	0890078R	220p	C	10	50
C2137	0890074R	100p	C	5	50
C2201	0800129R	22u	EL	-	25
C2202	0890027M	270p	C	5	50
C2203	0890027M	270p	C	5	50
C2205	0880035R	2n2	PF	10	50
C2206	0880044R	10n	PF	10	50
C2207	0890012M	18p	C	5	50
C2209	0890016M	39p	C	5	50
C2210	0880031R	1n0	PF	10	50
C2211	0890035M	1n0	C	10	50
C2214	0800143R	100u	EL	-	6V3
C2215	0890014M	27p	C	5	50
C2216	0890027M	270p	C	10	50
C2217	0880035R	2n2	PF	10	50
C2218	C150715	100n	MPO	10	63
C2220	0890017M	47p	C	5	50
C2221	0890022M	100p	C	5	50
C2251	C150715	100n	MPO	10	63
C2260	0890082R	390p	C	-	50

Ref No.	Part No.	Value	Type	Tol %	Voltage

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Ref. No.	Part No.	Description
IC001	2383514	HD401314RA26S
IC002	2361201	SN74LS02N
IC201	2003161	TA8690N
IC401	T900402	TBA820M
IC601	2003241	LTA8445K
IC703	2003235C	AN7809
⚠ IC1301	2386201	TLP751
IC1302	2000281	LVA523S
⚠ IC1401	2917781	CNX82A
IC1402	2383341	LVA522S
IC2050	2000281	LVA523S
IC2201	T900478	CF72303
IC2202	2009461	CF70064
IC2203	2009401R	PST529C
Q001	T631275	BC548B
Q002	T631275	BC548B
Q003	T633134	BF240
Q004	T631276	BC558B
Q006	T631276	BC558B
Q007	T631275	BC548B
Q008	T631275	BC548B
Q015	T631276	BC558B
Q201	T631275	BC548B
Q501	T631275	BC548B
Q502	T631275	BC548B
Q701	T633140	BF483
Q702	2327504	2SD1876
Q801	T631276	BC558B
Q851	T633137	BF459
Q852	T633137	BF459
Q853	T633137	BF459
Q901	T631290	BC328
Q902	T636039	BUX86
Q903	2314791	BUT12AF
Q904	T631291	BC368
Q905	T633138	BF423
Q1301	T631275	BC548B
Q1302	T631275	BC548B
Q1401	T631275	BC548B
Q2101	T631276	BC558B
Q2106	T631276	BC558B
Q2114	T631275	BC548B
Q2211	T631275	BC548B
Q2212	T631275	BC548B
Q2113	T631275	BC548B
D001	2338991	SLP/162B-60
D006	T531053	IN4148
D007	T531053	IN4148
D008	T531053	IN4148
D402	T531053	IN4148
D601	T531063	IN4002
D701	2343941M	RGP10G
D702	2343941M	RGP10G
D704	2343941M	RGP10G
D705	T531053	IN4148
D706	T531053	IN4148
D707	T531053	IN4148
D708	2343941M	RGP10G
D709	T531053	IN4148
D710	T531053	IN4148
D901-04	2344111M	BY134GP
D905	2343963M	MPG06J
D906	2343942M	RGP10J
D907	T531053	IN4148
D908	2343963M	MPG06J
D1301	2343941M	RGP10G
D2101	T531053	IN4148
D2219	2345251M	BB909B
ZD001	T536224	BZX79B5V6
ZD002	2335991M	HZT33-02TA
ZD003	T536213	4V3 ZENER 500mW
ZD501	T536181	13V ZENER 500mW
ZD701	T536224	BZX79B5V6
ZD702	2339251M	HZS36-ILT
ZD703	T536229	BZX79B9V1
ZD804	T536229	BZX79B9V1
ZD901	T536190	2V7 ZENER 500mW
ZD902	T536175	6V8 ZENER 500mW
ZD903	2344121M	P6KE130A
ZD1301	T536229	BZX79B9V1
ZD2050	T536229	BZX79B9V1
ZD2101	T536201	BZX79B5V1
L004	2123781R	100uH FILTER COIL
L005	2123781R	100uH FILTER COIL
L006	2123781R	100uH FILTER COIL
L101	2122956M	100uH AXIAL COIL
L201	2123781R	100uH FILTER COIL
L202	2123683	HIGH FREQ.TUNING COIL
L203	2123684	HIGH FREQ.TUNING COIL
L205	2122929M	1uH AXIAL COIL
L401	2122945M	15uH AXIAL COIL
L502	2122944M	12uH AXIAL COIL
L503	2122947M	22uH AXIAL COIL
L504	2122947M	22uH AXIAL COIL
L505	2122945M	15uH AXIAL COIL
L506	2143193	DELAY LINE PHASE
L701	2123331	22uH FILTER COIL WITH CORE
L702	2124191	62uH FILTER COIL
L704	2229521	LINEARITY COIL
L901	2124531	LINE FILTER COIL
L1301	2122956M	100uH AXIAL COIL
L1321	2122956M	100uH AXIAL COIL
L2050	2122956M	100uH AXIAL COIL
L2104	2122949M	33uH AXIAL COIL
L2201	2123092M	1.5uH AXIAL COIL
L2202	2123091M	1.2uH AXIAL COIL
⚠ T701	2435085	FLYBACK TRANSFORMER
T702	2260221	HORIZ.DRIVE TRANSFORMER
⚠ T901	2274731	SWITCHING TRANSFORMER
⚠ T1301	2274901	A/V TRANSFORMER

CRYSTALS, FILTERS, DELAY LINES etc.

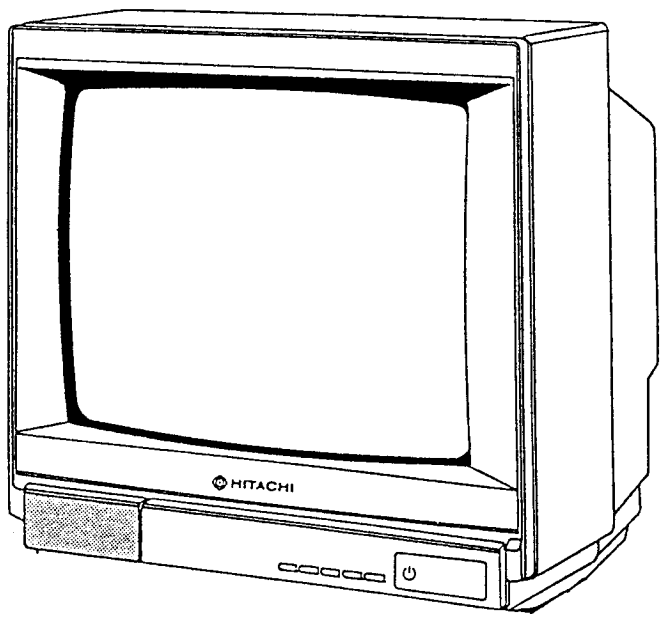
CP201	E518022	SAW FILTER SY153A/F1045AK
CP501	2150311	4.43MHz TRAP
DL501	L410134	CHROMINANCE DELAY LINE
DL502	2165902	LUMINANCE DELAY LINE
MF401	2142603	6MHz CERAMIC FILTER
MF402	2792161	CERAMIC DISCRIMINATOR
MF403	2142603	6MHz CERAMIC FILTER
MF501	2142244	6MHz CERAMIC TRAP
X001	2164791	4MHz CERAMIC RESONATOR
X501	2792151	4.43MHz CRYSTAL
X701	2168201	CERAMIC OSCILLATOR
X2201	2168231	55.5MHz CRYSTAL

HITACHI

C2118R
C2118T

SERVICE MANUAL

CAUTION:
Before servicing this chassis, it is important that the service technician read the "Safety Precaution" and "Product Safety Notices" in this service manual.



TECHNICAL SPECIFICATIONS

TV standard ..... 625-line single standard
Channel coverage ..... UHF channels 21-68
Aerial input impedance ..... 75 ohm unbalanced
Intermediate frequencies
- I.F. Luminance 39.5MHz
- I.F. Sound 33.5MHz
- I.F. Chrominance 35.07MHz
- F.M. Sound 6.0MHz
- Colour subcarrier 4.43MHz

Focusing ..... Electro static
Mains voltage 240V-50Hz
Fuses T2.5A
Picture tubes ..... C2118R A51EAL30X11
C2118T ..... A51JSY61X21 (H)

Programme Selectors ..... Channel up/down buttons with 30 programme remote control

Speaker ..... 8 × 12cm 8 ohm

Sound output ..... 2W RMS

Power consumption ..... 86W approx.

Dimensions:
- Width 503mm
- Height 474mm
- Depth 475mm
- Weight ..... 22kg approx.

● Since this is a basic circuit, the value of the parts and specifications are subject to be altered for improvement.

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SAFETY PRECAUTIONS

WARNING: The following precautions should be observed.

1. Do not install, remove, or handle the picture tube in any manner unless shatter proof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep the picture tube away from the body while handling.
2. When service is required, an isolation transformer should be inserted between power line and the receiver before any service is performed on the chassis.
3. When replacing the chassis in the cabinet, ensure all the protective devices are put back in place, such as barriers, non-metallic knobs, adjustment or compartment covers or shields, isolation resistors/capacitors, etc.
4. When service is required, observe the original lead dressing. Extra precaution should be taken to assure correct lead dressing in the high voltage circuitry area. Particularly note the R.G.B. lead dressing. Ensure they are dressed well away from the horizontal scan and F.B.T. circuitry.
5. Always use the manufacturer's replacement component. Always replace original spacers and maintain lead lengths. Especially critical components are indicated thus ⚠ on the parts list and should not be replaced by other makes. Furthermore, where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective, or inadvertently damaged during servicing.
   Therefore, the following checks are recommended for the continued protection of the customers and service technicians.

INSULATION

Insulation resistance should not be less than 10MΩ at 500V DC between the mains poles and any accessible metal parts.
Also, no flashover or breakdown should occur during the dielectric strength test, applying 3kV AC or 4.25kV DC for two seconds between the main poles and accessible metal parts.

HIGH VOLTAGE

High voltage should always be kept at the rated value of the chassis and no higher. Operating at higher voltages may cause a failure of the picture tube or high voltage supply, and also, under certain circumstances could produce X-radiation moderately in excess of design levels. The high voltage must not, under any circumstances, exceed 27kV on the chassis. (29kV on C2118T models.)

X-RADIATION

TUBES: The primary source of X-radiation in this receiver is the picture tube. The tube utilised for the above mentioned function in this chassis is specially constructed to limit X-radiation.
For continued X-radiation protection, replace tube with the same type as the original HITACHI approved type.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in HITACHI television receivers have special safety related characteristics. These characteristics are often not evident from visual inspection, nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified by marking with a ⚠ on the schematics and replacement parts list in this Service Manual.
The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create electrical shock, fire, X-radiation, or other hazards.
Product Safety is continuously under review, and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of HITACHI Service Manuals, may be obtained at a nominal charge from your HITACHI SALES CORPORATION.

TUBE DISCHARGE

The line output stage can develop voltages in excess of 25kV; if the E.H.T. cap is required to be removed, discharge the anode cap to chassis via a high value resistor, prior to its removal from the tube.

CIRCUIT DESCRIPTION

Vision IF Stages

The tuner used on this chassis is type U743. It is powered by the +12v supply, and tuned by a variable voltage applied to the VT terminal.
The IF signal is applied to the base of amplifier Q201, then input to pins 9 and 10 of IC201 via the SAW filter CP201. The internal amplifier at pins 9 and 10 consists of three stages, and has its gain controlled by the AGC circuit. The response speed of this IF AGC stage is determined by the external components connected to pins 6 and 7.
The output from the IF amplifier is fed to the video detector circuit. The picture carrier is limited and phase shifted by the tank circuit connected to pins 45 and 46 of the IC, and this produces a reference frequency which is used for synchronous video detection.
The tank circuit connected to pin 47 does the same for the AFC detector circuit, setting the centre frequency of the AFC, thereby controlling the AFC output voltage at pin 48. This voltage is applied to the VT terminal via R101/R102 to correct any frequency drift.
An RF AGC voltage is output from pin 51 of the IC, and is fed to the tuner to control the gain. The starting point of this AGC is determined by the voltage level at pin 52, which is set by VR202.
The output from the video detector is fed to a noise inverter. This circuit inverts any white noise or black noise pulses that exceed certain levels, and changes them to a grey level (clamp level). In this way an excellent signal/noise ratio is maintained. The composite video signal is output from pin 43.

Sound IF Stages

The composite video from pin 43 of IC201 is applied to MF401 via R509. The 6MHz sound component is filtered out, then input to pin 49 via C401.
FM detection is performed internally, with the external components MF402, L401, R408 etc., forming the tuned circuit required by the detector. The audio output from pin 3 of IC201 is applied to the audio switching IC (IC1402) at pin 6. It then emerges at pin 4 and is input to pin 1 of IC201 for further processing. The capacitor C403 on pin 3 performs the necessary de-emphasis, and an internal attenuator stage sets the output level. This attenuator is controlled by a variable DC voltage level applied to pin 50. The audio output emerges at pin 53, and is then applied to IC401 pin 3. This IC, type TBA820M, is powered by the +10v supply fed to pin 6 via R402, and the amplified audio output is applied to the speaker from pin 5 via C413.

Luminance Stages

The luminance stages of IC201 consist of a picture sharpness circuit, a contrast control circuit, a brightness control circuit, and an output stage. The composite video output from pin 43 is fed via R510 to the 6MHz trap MF501. The luminance signal is then fed via Q501, IC1302 (TV/VTR switching), and CP501 to pin 31 of the IC. The components R507, L504, and C504, differentiate the high frequency component of the signal and applies the result to pin 33. The signal input to pin 31 is also fed internally to a low pass filter stage, which removes the high frequency content. The three types of signal are then input to the picture sharpness control stage, whose gain is controlled by the DC voltage level fed to pin 33 via R515, R514, and R508. The output from this stage is applied to the contrast circuit, whose operation is controlled by the DC voltage level at pin 39.
The luminance signal is then fed to the brightness circuit, which is controlled by the voltage level at pin 34. The capacitor C501 on pin 15 ensures a constant black level is maintained by this stage. The processed luminance signal with horizontal and vertical blanking added, is output from pin 19. It is then fed via Q801, and added to the red, green, and blue amplifiers Q851, Q852 and Q853.
A beam current limit circuit is employed on this chassis. Should the beam current rise, the voltage at pin 4 of the flyback transformer will become "low". This "low" will be applied to D706 cathode, turning it on and pulling "low" pin 39 of IC201. This will reduce the contrast level and hence the beam current.

Chrominance Stages

The composite video is fed via C507, to the bandpass circuitry L503/C508 and R521, where the chrominance component is extracted then input at pin 35 to an ACC amp. circuit. The output from this stage is applied to a burst amp./delay line amp.circuit, then output at pin 38. A direct signal is also fed internally to the PAL matrix stage. The output from pin 38 is fed to the delay line D501, then also input to the PAL matrix stage at pin 41. This matrix circuit produces continuous R-Y and B-Y colour signals, by the adding and subtracting of these two signals. They are then applied to a colour control stage, whose output is determined by the D.C. voltage at pin 40. From this stage the two colour signals are fed to the demodulator stage of the IC, then further matrixed to produce the G-Y signal. The three colour signals finally emerge from pins 16, 17, and 18 of IC201, then are added to the Y signal at Q851, Q852 and Q853.
The crystal oscillator X501 and associated circuitry at pins 11, 12, and 14, provide reference frequencies to operate the phase control, demodulator, colour killer, and ident.circuits of the IC.

External Audio/Video Circuitry

This circuitry receives signals from the TV chassis or the 21 pin external connector, and depending on the switching state of the IC's, selects which signals will be applied to IC201 for further processing.
The switching state of IC1302/IC1402 is determined by the voltage supplied to pin 7 of each IC, which is controlled by IC001. When in the TV mode of operation, the switching voltage is "low", but when AV is selected, pin 28 of IC001 will become "high", and this is applied to pin 7 of each switching IC. This changes their mode of operation, thereby diverting the external signals to IC201.
In the TV mode of operation, the audio signal from the chassis is input to pin 6 of IC1402, output from pin 4, then applied to pin 1 of IC201 for further processing. The composite video at Q501 emitter is input to pin 6 of IC1302, output from pin 4, and finally input to pin 31 of IC201.
In the external mode of operation, the audio input from the 21 pin connector is applied to the base of Q1401, then fed via opto-coupler IC1401 to pin 8 of IC1402. It is then output from pin 4, and applied to pin 1 of IC201 for processing. The video signal from the 21 pin connector is applied to Q1301 base, fed via opto-coupler IC1301 and transistor Q1320 to pin 8 of IC1302. The output from pin 4 is diverted to pin 31 of IC201 as for TV mode.
IC1302 and IC1402 are powered by the chassis +9v supply. The chassis H.pulse fed to T1301 produces a secondary voltage which is rectified by D1301 to supply IC1301 and IC1401. This ensures that the 21 pin connector remains isolated from the chassis.

Deflection Circuits

The deflection circuitry of IC201 incorporates a sync.separator stage, horizontal oscillator and output stages, a vertical count-down, and vertical output stage.

Horizontal Stages

The composite video at Q501 emitter is input to the sync.separator stage at pin 36. The phase detector stage is provided with a sawtooth waveform generated from the line pulse input at pin 21. This phase detector will then compare the sawtooth to the sync.pulse. Any frequency difference will cause a corrective output to be applied to

the horizontal oscillator, thereby maintaining the desired phase relationship. The components connected to pin 23 form a filter network for the phase detector, and X701 at pin 24 provides the oscillator frequency, therefore eliminating the need for external adjustment.
The horizontal output emerges at pin 22, and is applied to the base of line drive transistor Q701. T702 couples the output of Q701 to the line output transistor Q702. Both these transistors are powered by the H.T supply voltage.
A line pulse available at pin 1 of the flyback transformer, is rectified by D701, smoothed by C711, and provides approximately +180v to drive the output transistors Q851, Q852, Q853. Under certain fault conditions, i.e. increased H.T. supply voltage, low line oscillator frequency, or reduced value of the tuning capacitor C708, an excess of E.H.T. could be developed. To prevent this happening, the output voltage obtained from pin 1 of the flyback transformer is fed via the potential divider R715, R716, and applied to ZD702. Should the E.H.T. rise excessively, the threshold of the zener will be exceeded, and a voltage is applied to pin 20 of IC201. This operates an internal protection circuit which will output a "low" from pin 22, turning Q701 off, thereby preventing further E.H.T. generation.
Excessive beam current may also occur under fault conditions, so this is prevented in the following manner. The voltage at R714 is smoothed by R713/C714 and applied to ZD701. If the beam current rises excessively, the threshold of the zener will be exceeded, and a voltage is applied to pin 20 of IC201. This prevents further E.H.T. generation as previously explained.
The L.T. supplies for the chassis are obtained from the flyback transformer.
The +12v required for the tuner is derived at pin 5, rectified by D704, smoothed by C715, and protected by fusible resistor R720.
The +9v supply for IC201 etc., is obtained from the +12v supply via IC703.
The +10v required by IC401 is obtained from D708/C724, and protected by fusible resistor R730.
The supply of +25v required for IC601 is obtained by D702/C712, with protection afforded by fusible resistor R719.
Q750/Q751 stage forms an E.H.T. stabilizing circuit. The voltage appearing at pin 4 of the Flyback transformer is smoothed by R751/C751 and applied to the base of Q750. The emitter voltage of Q750 is then applied to the base of Q751 as the drive. The resulting drive current at the collector of Q751 controls the inductance of L703 secondary, which in turn controls the voltage value at pin 9 of the Flyback transformer. Therefore, when a change in brightness takes place on the screen, the voltage level at pin 4 of the flyback transformer will alter, changing the inductance of L703 and maintaining the voltage supplied to pin 9 at a constant level. As the voltage from pin 9 supplies the E.H.T stages, this ensures a stabilized output is maintained.

Vertical Stages
The internal vertical sync. of IC201 is fed to a triggered vertical divider stage, which counts down the horizontal frequency to obtain the vertical frequency, thereby eliminating the need for a conventional oscillator circuit. This also has the advantage that no external frequency control adjustment is required.
The vertical pulse output from pin 30 of IC201 is inverted by Q601, and applied to pin 2 of IC601. The capacitor C602 at pin 5 of the IC is used to provide ramp generation, producing a sawtooth output which is then used to drive the vertical output stages of the IC601.
The components D601/C603 determine the flyback generation time, and a vertical output is obtained from pin 11 to drive the vertical deflection coils. The deflection current that occurs at R611/R612 junction is added to the feedback obtained from R609/C605, with the result being applied to pin 3 of IC601 to control linearity and height. The values of R609, C605 determines the linearity, whilst VR615 sets the height.

Power Supply Stage
The AC voltage input is rectified by D901-04, and smoothed by C904. This produces a DC voltage which is applied to Q903 collector. The current flowing through R902, R903, to the base of Q903, will cause the transistor to conduct once the difference between the base and emitter reaches 0v7. As the transistor begins to conduct, a feedback from T901 winding charges C908 via R904, R914. The charging action of C908 causes a reduction to the base current of Q903, and eventually Q903 becomes non conducting. When this happens, the feedback from T901 winding will reverse, and as a result the base current of Q903 will begin to rise once more, turning Q903 on again. This self oscillating circuit operates at a frequency determined by the values of C908, R904, R908 etc.
The energy produced in T901 during the conducting time of Q903 is rectified by D906, smoothed by C905, and supplies the chassis with it's H.T. voltage. At the same time, the voltage rectified by D906/C906 is applied to the base of Q905 via R909, VR901, and R910. This voltage is compared to the emitter voltage obtained via ZD902. Any difference is amplified by the error amplifier transistor Q905, then applied to Q904, which will conduct more or less as a result, thereby altering the base current and consequently changing the on-time length of Q903. In this way, regulation of the H.T. voltage is maintained, with VR901 setting the desired level.
ZD903 gives protection to this H.T. circuitry should the level rise excessively.
When a standby command is received by IC001, pin 13 will output a "high". This is then applied to the base of Q902, turning it on and pulling it's collector "low". D908 will then conduct, and as a result Q901 turns on. This effectively short circuits the base and emitter of Q903, causing the power supply to shut down. Once the standby command is released, the "high" at pin 13 is removed, Q902 will turn off, and the power supply will begin to operate again.

Remote Control and Tuning Circuits
The remote control receiving unit U001, contains an infra red amplifier type GP1U721Q. This is driven by the +5v supply, which is obtained from Q007 in conjunction with D907. This +5v supply is stabilized by ZD001. The output from the infra red amplifier is input to pin 40 of IC001, type HD401314RA26S.
This IC will perform channel selection, UP/DOWN analogue control, gives on-screen displays, and operates the search routine etc.
IC001 also has a 2k bit E2PROM memory, which stores all the channel data for the programmes 0-29, including all the analogue settings etc. This IC is also powered by the +5v supply, and it's various operations are controlled by the 4MHz oscillator X001 at pins 2 and 3.
When first switched on, IC001 must be initially reset, and this is achieved by Q002 stage. As the +5v begins to rise from switch on C030 charges, and as a result Q002 turns on, pulling it's collector "low". This "low" is applied to pin 41 of IC001, resetting the IC. Once the +5v has been reached, C030 will cease it's charging action, and Q002 will turn off. This removes the "low" at pin 41, thereby releasing the reset condition of the IC.
When the search routine is initiated, the mark/space ratio output at pin 42 will change, and this change is applied to Q003. The resultant voltage at the collector will be integrated and filtered by C031, R041/C033, R042/C034, and then applied to the VT terminal of the tuner as the variable tuning voltage.
Once a station is received, the video signal at Q501 emitter is applied to the base of Q004 via R092, C040. The sync.pulse appearing at the collector of Q004 is input to pin 38 of IC001. This informs the IC that a signal is

present. It will then check that the signal is a valid one by detecting the presence of the AFC signal at pin 37. If this is correct, the search routine is halted. Whilst tuning is taking place, pin 29 of IC001 will go "high" turning Q008 on, placing ZD003 into circuit. The voltage fed via R069, D008, is then clamped to approximately 4v. This ensures that the AFC voltage fed to the VT terminal via R101 remains at a constant level. In this way accurate tuning can be achieved. Once a signal has been located, pin 29 will go "low" turning Q008 off once more.
The AFC voltage at pin 43 of IC201 is then applied to the VT terminal of the tuner, thus correcting any frequency drift that occurs.
The timer functions of IC001 are controlled by the clock signal input to pin 39. This is a 50Hz signal obtained from the mains input via R905, D007, and R057.

Alarm: Once the amount of time input for this function has elapsed, an output is obtained from pin 11 of IC001. This is applied to the sound output stage via the components C001, R407, and causes a bleep sound to be heard.

Off Timer: When the amount of time input for this function has elapsed, pin 13 of IC001 will output a "high" to Q902 base. The transistor then turns on, placing the receiver into it's standby mode as previously explained.

On Timer: When the desired "ON" time has been input, the standby mode must then be selected. Once this has been done, an alternating "high" and "low" is output from pin 12 of IC001. This is applied to Q001, causing it to turn on and off alternately. As a result, Q006 will also turn on and off, causing the LED D001 to flash, thereby giving a visible indication that the receiver is in the "ON" timer mode. Once the amount of time input has elapsed, the "high" output from pin 13 of IC001 is removed, and the receiver is brought out of its standby mode.

The contrast, brightness, colour and volume levels, are controlled by outputs from pins 33, 34, 35, and 36 of IC001. These outputs produce varying DC voltages, which are applied to the relevant pins of IC201.
On-screen displays for the analogue levels, the search routine, and the timer functions, are controlled by IC001. The components R011 and C009 on pin 20 determine the oscillating frequency, and in conjunction with the horizontal and vertical pulses input to pins 14 and 15, controls the position of the displays on screen. The red, green, and blue on-screen signals are output from pins 16, 17, and 18 respectively. They are then input to IC002, which is a 2-input NOR gate IC. The signals are reversed, output from pins 1, 4, and 10, then input to IC201 at pins 26, 27, and 28. They are then combined with the R-Y, G-Y, and B-Y signals of IC201.

Teletext Circuit (C2118T models)
The two main IC's which control the teletext operations are IC2201 type CF72303, and IC2202 type CF70064. IC2201 is the data slicer, whilst IC2202 is the decoder, character generator and controller. IC2202 also contains a 1k byte RAM. The text data is applied to pin 17 of IC2202. The text RGB display signals are output from pins 20, 22, and 23 of IC2202. They are then fed via Q2211, Q2212, and Q2213 to IC002, and from there to IC201 where they are output from pins 16, 17 and 18.
During teletext mode, a "high" is output from pin 19 of IC2202. This is applied to pin 7 of IC2050, and prevents the video output from appearing at pin 4. Therefore no Y signal is processed by IC201 during teletext operation. The "high" signal at pin 7 of IC2050 is also applied to the base of Q502. This turns the transistor on, and as a result pin 35 of IC201 is pulled "low", thus also preventing chrominance demodulation from taking place during teletext operation. However, during the MIX mode of teletext IC2050 is allowed to operate, thereby superimposing the teletext information onto the TV signal information applied to Q851, Q852 and Q853.
IC2203, type PST529C, performs the reset operation for IC2202 when the receiver is first switched on, or brought out of standby. Until the voltage at pin 1 of IC2203 reaches 4v5, the output at pin 3, which supplies pin 5 of IC2202 (reset pin) is "low", therefore initiating the reset condition. Once the voltage level at pin 1 of IC2203 exceeds 4v5, then the output at pin 3 becomes "high", releasing the reset condition.
IC2201 and IC2202 each have their own oscillator. The crystal oscillator X2201, which operates at 55.5MHz is utilised for IC2201, whilst IC2202 uses a variable capacitance diode D2219 to achieve the desired oscillating frequency of 22MHz.
IC2201 has two main functions. The first is to acquire the teletext information. The video signal is fed via the transistors Q2214, Q2101, and input to pin 6 of IC2201. Teletext CLOCK and DATA outputs are then obtained from pins 17 and 18. Secondly, a composite sync.signal is required.
The video signal at pin 6 of IC2201 is also applied to pin 2 via C2205 and R2208. A composite sync.signal is then made available at pin 14.
The DATA, CLOCK and SYNC.signals are then applied to pins 10, 11, and 12 of IC2202 for further processing.

PICTURE AND CONTROL ADJUSTMENTS

AGC Adjustment
1. Switch TV on and allow to warm up for at least two minutes.
2. Receive a signal with a level of −47dBm.
3. Connect a voltmeter to the AGC terminal of the tuner.
4. Adjust VR202 until meter reads 7v5 +/− 0v5.

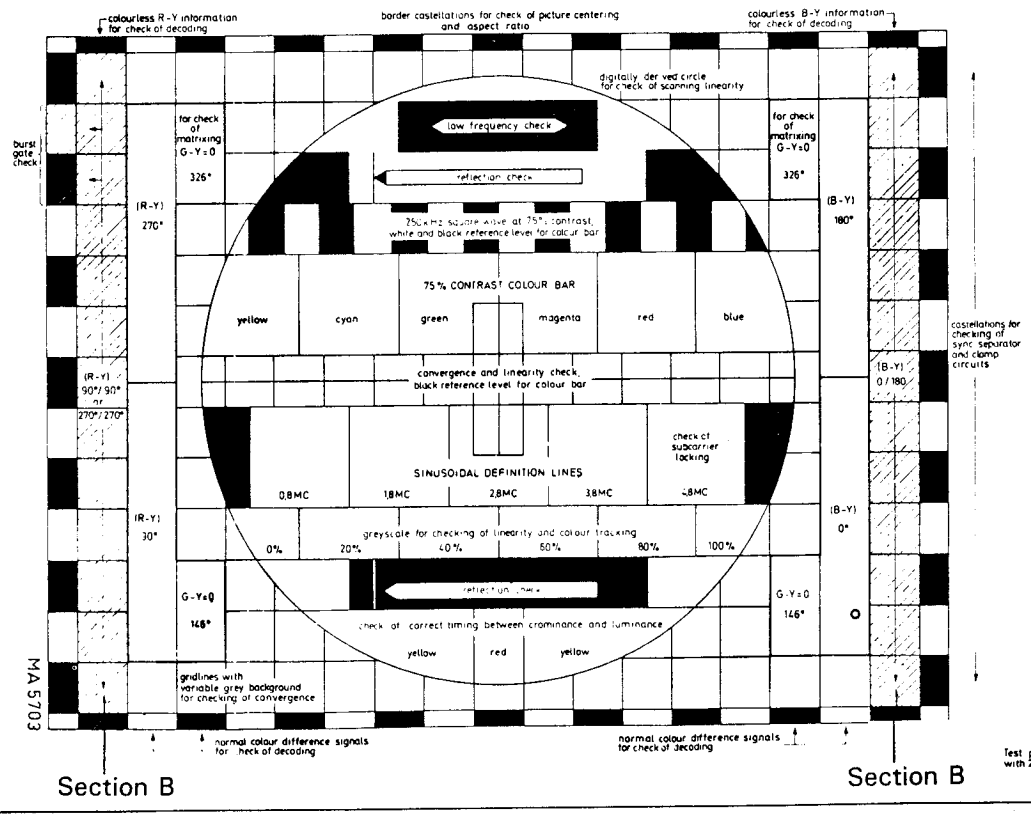
HT Adjustment
1. Switch TV on, receive Philips test pattern and set contrast, and brightness levels to maximum.
2. Connect a voltmeter to +ve leg of C905.
3. Adjust VR901 so that meter reads 112v +/− 0v2.

Focus Adjustment
1. Receive Philips circle test pattern.
2. Set colour level to minimum, contrast and brightness to maximum.
3. Adjust contrast control so that the first two bars of the colour bar display section are black.
4. Adjust focus control knob (upper control on FBT) for the best overall result.

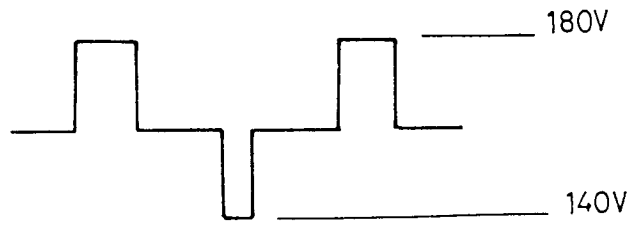
Vertical Height Adjustment
1. Receive Philips circle test pattern and allow TV to warm up for 5 minutes.
2. Set contrast and brightness levels to maximum.
3. Adjust VR615 till the desired picture height is obtained.

Delay Line Adjustment
1. Receive Philips circle test pattern, and set colour control to a level of 20-30 on the on-screen display.
2. Adjust VR501 to minimise venetian blind effect in section "B" of the test card as shown below.
3. Next adjust L506 to minimise venetian blind effect in the magenta portion of circle pattern.
4. Repeat steps 2 and 3 for the best overall result.

COMPOSITION OF TEST CARD PROVIDED BY PHILIPS PM5544



Screen Control Adjustment
1. Receive horizontal white line pattern and set contrast level to minimum.
2. Connect an oscilloscope to the RGB cathodes of the CRT in turn, and leave on the cathode with the highest display level.
3. Adjust brightness till the level displayed on the oscilloscope is as shown in the drawing.



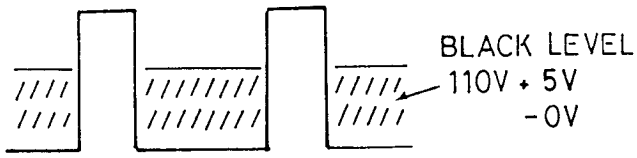
4. Disconnect oscilloscope and turn screen control (lower knob on FBT) until the single line is just visible on the screen.
5. Adjust the two BKG controls that differ from the colour of the single line, until the line becomes white once more.

White Balance Adjustment

1. Receive a white raster pattern and adjust brightness until raster is just visible on the screen.
2. Check the white balance, and if not satisfactory adjust the two background controls that were altered in Screen Control Adjustment until correct white balance is obtained.

Sub-Brightness Adjustment

1. Allow TV to warm up for a period of 20 minutes after switch on.
2. Receive the Philips circle test pattern, and set colour to minimum, brightness and contrast to maximum.
3. Turn sub-brightness control VR502 fully clockwise.
4. Note and mark the position of the screen control knob on the FBT, then turn fully counter clockwise.
5. Connect an oscilloscope to each RGB cathode of the CRT in turn, and leave connected to the cathode giving the highest voltage.
6. Adjust VR502 so that the black level voltage is as shown.



7. Once correct setting is obtained, return screen control knob to original position.

PROTECTION CHECKS

High Voltage Limit Check

1. Switch TV on and set contrast and brightness levels to maximum.
2. Connect an 805K resistor in parallel with R715 and ensure that picture and sound disappear instantly.
3. Switch off TV and wait 10-15 seconds.
4. Switch TV on again, then return contrast and brightness to normal operating levels.

Anode/Focus s/c Check

1. Switch TV on and set contrast and brightness levels to maximum.
2. Connect a 4K7 resistor from the +9v supply (+ve leg of C722) to the cathode of ZD701.
3. Check that picture and sound disappear instantly.
4. Switch TV off, remove resistor and wait 10-15 seconds.
5. Switch TV on again, then return contrast and brightness settings to their original levels.

VOLTAGE TABLES

The following voltages were taken using a 20k ohms/volt meter, with the colour, contrast, and brightness levels set to give normal viewing levels on a colour bar display.

IC001 HD401314RA26S			
Pin	Voltage	Pin	Voltage
1	0v	22	4v6
2	0v5 (10v range)	23	4v6
3	2v3	24	4v6
4	0v	25	4v6
5	0v	26	4v6
6	not used	27	4v4
7	0v (4v8 teletext)	28	0v (4v8 AV mode)
8	not used	29	0v3 (4v8 preset mode)
9	0v	30	4v9
10	4v4	31	not used
11	0v	32	not used
12	0v	33	0v-4v8 min-max contrast
13	0v (4v6 standby)	34	0v-4v8 min-max brightness
14	0v2	35	0v-4v8 min-max colour
15	0v2	36	0v-4v8 min-max volume
16	0v	37	1v6
17	0v	38	0V4
18	0v	39	0V8 (10v range)
19	not used	40	4v2
20	4v8	41	4v0
21	5v0	42	0v-4v8 (varies with tuning)

The voltage of pin 12 will fluctuate when "ON" timer mode has been set and TV is placed into standby

IC201 TA8690N			
Pin	Voltage	Pin	Voltage
1	3v0	28	1v8
2	3v8	29	0v6 (10v range)
3	4v2	30	0v2
4	2v9	31	2v5
5	3v6	32	0v
6	5v2	33	5v8
7	5v2	34	4v0-4v3 min-max brightness
8	0v	35	4v6
9	3v7	36	3v0
10	3v7	37	0v
11	4v4	38	6v0
12	3v9	39	3v8-5v1 min-max contrast
13	8v8	40	2v6-4v6 min-max colour
14	6v2	41	3v8
15	0v8	42	3v0
16	5v2	43	3v0
17	5v2	44	8v8
18	5v2	45	6v5
19	3v6	46	6v5
20	0v2	47	2v9
21	1v1	48	3v8
22	1v8	49	3v9
23	6v5	50	0v5-4v5 min-max volume
24	4v7	51	6v5
25	9v0	52	1v6
26	1v8	53	3v8
27	1v8	54	2v8

IC002 SN74LS02N			
Pin	Voltage	Pin	Voltage
1	3v7	8	0v2
2	0v2	9	0v1 (0v6 teletext)
3	0v1 (0v6 teletext)	10	3v7
4	3v7	11	not used
5	0v2	12	not used
6	0v1 (0v6 teletext)	13	not used
7	0v	14	5v0

IC401 TBA820M			
Pin	Voltage	Pin	Voltage
1	0v6	5	6v3
2	1v0	6	12v
3	0v4	7	12v
4	0v	8	not used

IC601 LA7835			
Pin	Voltage	Pin	Voltage
1	9v0	8	2v0
2	8v6	9	not used
3	4v5	10	0v
4	0v	11	14v
5	4v5	12	25v
6	4v0	13	3v5
7	25v		

IC1301 TLP751			
Pin	Voltage	Pin	Voltage
1	not used	5	0v
2	7v6	6	1v3
3	6v0	7	1v8
4	not used	8	9v0

IC1302 LVA523S			
Pin	Voltage	Pin	Voltage
1	not used	6	3v8
2	9v0	7	0v (4v2)
3	not used	8	3v2
4	3v2	9	0v
5	0v		

Brackets = AV mode

IC1401 CNX82A			
Pin	Voltage	Pin	Voltage
1	7v6	4	1v7
2	6v6	5	9v0
3	not used	6	not used

IC1402 LVA522S			
Pin	Voltage	Pin	Voltage
1	not used	6	4v0
2	9v0	7	0v (4v2)
3	not used	8	4v1
4	3v8	9	0v
5	0v		

Brackets = AV mode

IC2050 LVA6235			
Pin	Voltage	Pin	Voltage
1	not used	6	3v8
2	8v8	7	0v3(4v2)
3	not used	8	3v3
4	3v2(2v8)	9	not used
5	0v		

Brackets = teletext mode

Note: Use isolated earth (i.e. shield of 21 pin socket) when measuring the voltages of Q1301, Q1401, and isolated pins of IC1301, IC1401.

	Q001	Q002	Q003	Q004	Q006	Q007
E	0v	0v	0v	5v0	25v*	5v0
B	0v*	0v	varies with	4v8	24v*	5v5
C	22v*	4v0	tuning	0v4	22v*	22v

* Fluctuates in "ON" timer mode with TV in standby

* Fluctuates in "ON" timer mode with TV in standby

	Q008	Q013	Q015	Q201	Q501	Q502
E	0v	0v	5v0	0v4	2v4	0v
B	0v (0v6 preset mode)	0v2 (0v5)	4v2	1v0	3v0	0v2(6v6)
C	1v8 (0v1 preset mode)	*0v4 (0v)	2v8	6v0	8v8	0v

*Depends on Volume
Brackets = no signals

Brackets = teletext

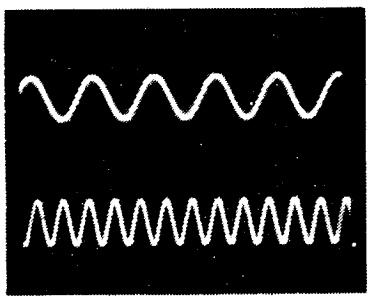
	Q601	Q701	Q702	Q750	Q751	Q801	Q851
E	0v	0v	1v9	8v0	3v0	4v2	5v0
B	—	−1v5	1v7	8v2	2v2	3v8	5v2
C	8v5	62v	110v	25v	1v0	0v	115v

	Q852	Q853	Q901	Q902	Q903	Q904
E	5v0	5v0	110v	0v	110v	110v
B	5v2	5v2	112v	0v (0v5 standby)	110v	110v
C	115v	115v	110v	300v (0v1 standby)	320v	110v

	Q905	Q1301	Q1320	Q1401	Q2101	Q2106	Q2114
E	215v	1v2	0v6	1v1	5v1	4v2(3v8)	1v8
B	115v	1v8	1v2	1v7	4v5	3v3(3v0)	2v3
C	105v	6v2	3v2	6v6	2v4	0v	4v5

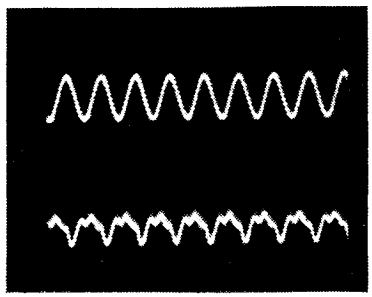
Brackets = teletext

SOME WAVEFORMS FOR THE C2118R/T CHASSIS. TAKEN USING A 10:1 PROBE, SCOPE SET TO 20μ SECS/CM UNLESS OTHERWISE STATED. COLOUR, CONTRAST AND BRILLIANCE SET TO GIVE NORMAL VIEWING LEVELS.



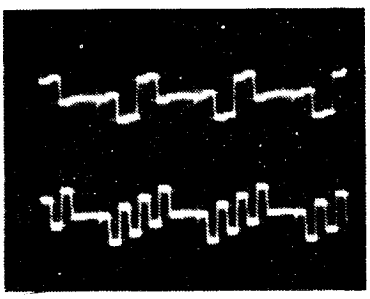
IC201 pins 1, 2, 3.
Iv0 p.p. at 0·5m secs/cm.
Pin 2 measured at maximum volume

IC201 pins 4 + 5
1v0 p.p. at 0·2μ secs/cm



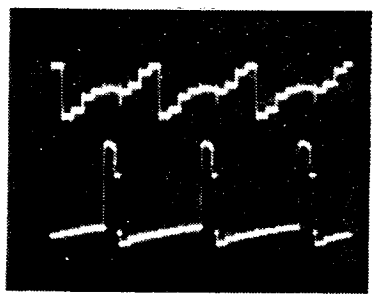
IC201 pin 12
0v3 p.p. at 0·2μ secs/cm

IC201 pin 14
1v0 p.p. at 0·2μ secs/cm



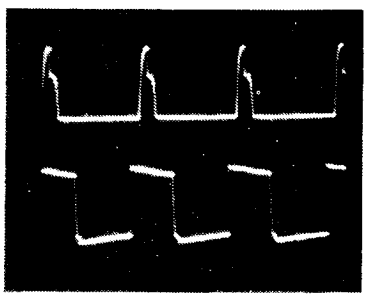
IC201 pin 16
2v5 p.p.

IC201 pin 17
3v0 p.p.



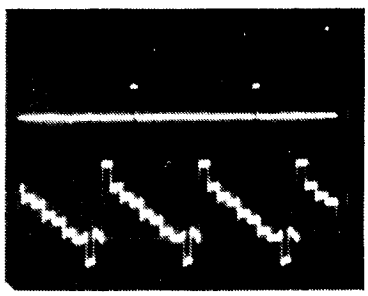
IC201 pin 18
1v5 p.p.

IC201 pin 19
8v0 p.p.



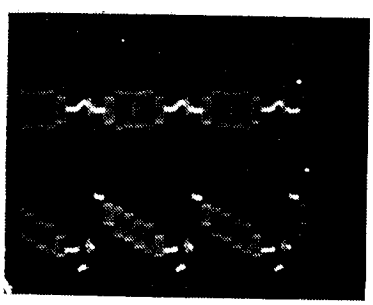
IC201 pin 21
3v0 p.p.

IC201 pin 22
6v0 p.p.



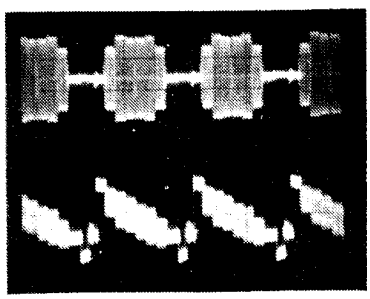
IC201 pin 30
5v0 p.p. at 5 m secs/cm

IC201 pin 31
0v8 p.p.



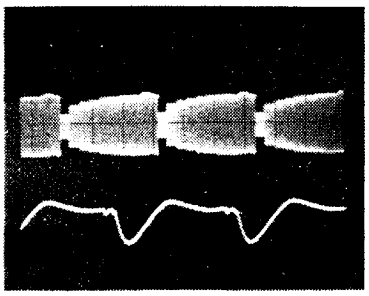
IC201 pin 35
0v1 p.p.

IC201 pin 36
1v5 p.p.



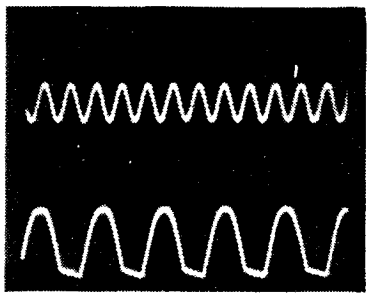
IC201 pin 38
1v2 p.p.
IC201 pin 41
0v2 p.p.

IC201 pin 43
1v8 p.p.



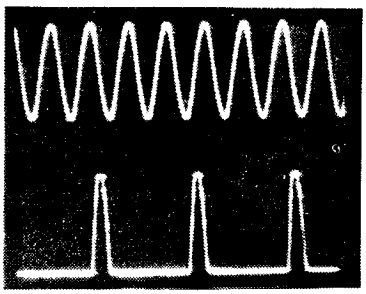
IC201 pins
45 + 46
0v2 p.p.

IC201 pin 48
0v5 at 5 m
secs/cm



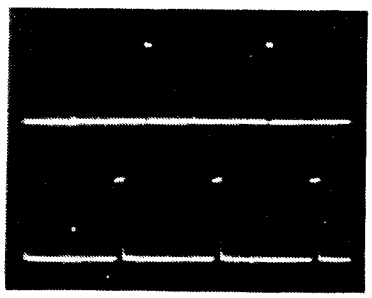
IC201 pin 49
0v1 p.p. at 0·2μ
secs/cm

IC201 pin 53
3v0 p.p. maximum
volume at 0·5 m
secs/cm



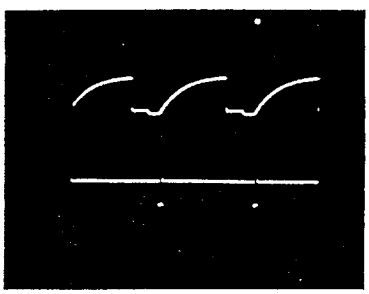
IC001 pins 2 + 3
3v0 p.p. at 0·2μ
secs/cm pin 2
4v0 p.p. at 0·2μ
secs/cm pin 3

IC001 pin 14
6v0 p.p.



IC001 pin 15
5v0 p.p. at 5 m
secs/cm

IC001 pin 38
5v0 p.p.

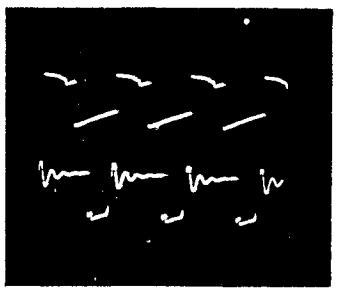


IC001 pin 39
4v0 p.p. at
5m secs/cm

IC601 pin 2
8v0 p.p. at
5m secs/cm

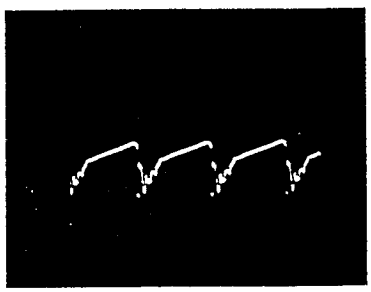
IC601 pin 5
1v8 p.p. at 5m
secs/cm

IC601 pin 11
42v p.p. at 5m
secs/cm



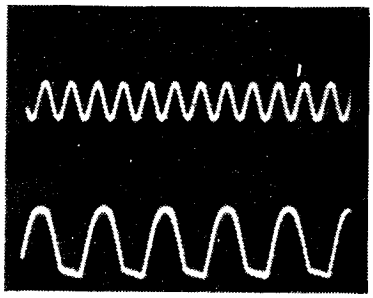
Q701 base
4v0 p.p.

Q701 collector
60v p.p.



Q702 base
15v p.p.

IC201 pins
45 + 46
0v2 p.p.

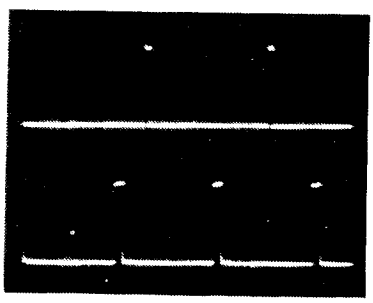


IC201 pin 49
0v1 p.p. at 0·2μ
secs/cm

IC201 pin 48
0v5 at 5 m
secs/cm

IC201 pin 53
3v0 p.p. maximum
volume at 0·5 m
secs/cm

IC001 pins 2 + 3
3v0 p.p. at 0·2μ
secs/cm pin 2
4v0 p.p. at 0·2μ
secs/cm pin 3

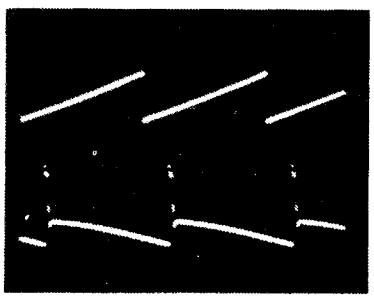


IC001 pin 15
5v0 p.p. at 5 m
secs/cm

IC001 pin 14
6v0 p.p.

IC001 pin 38
5v0 p.p.

IC001 pin 39
4v0 p.p. at
5m secs/cm

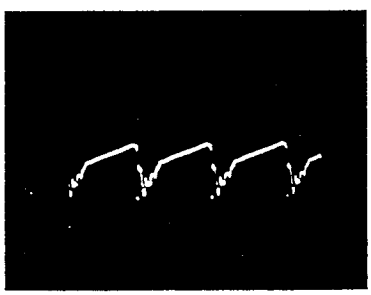


IC601 pin 5
1v8 p.p. at 5m
secs/cm

IC601 pin 2
8v0 p.p. at
5m secs/cm

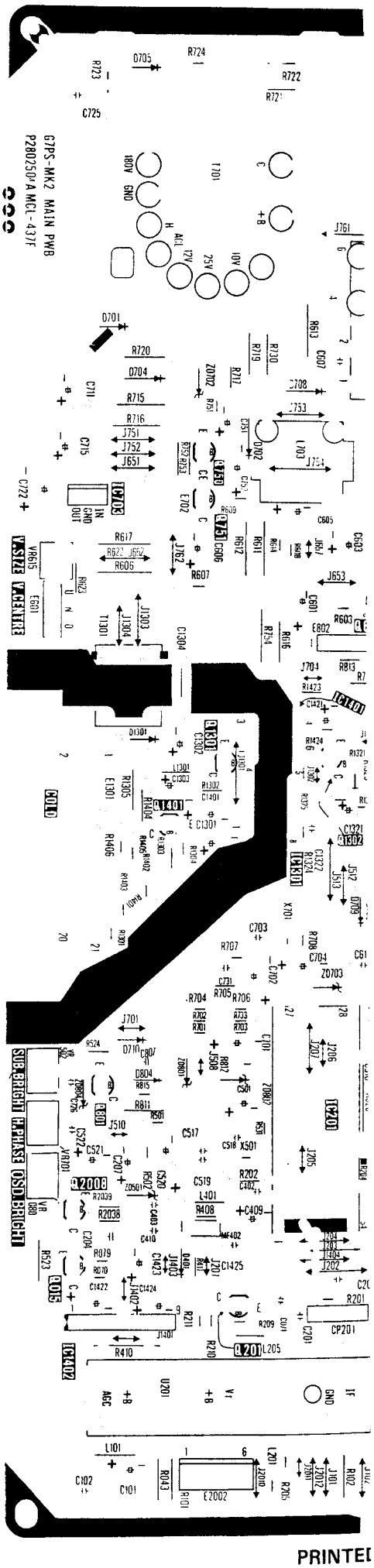
IC601 pin 11
42v p.p. at 5m
secs/cm

Q701 base
4v0 p.p.

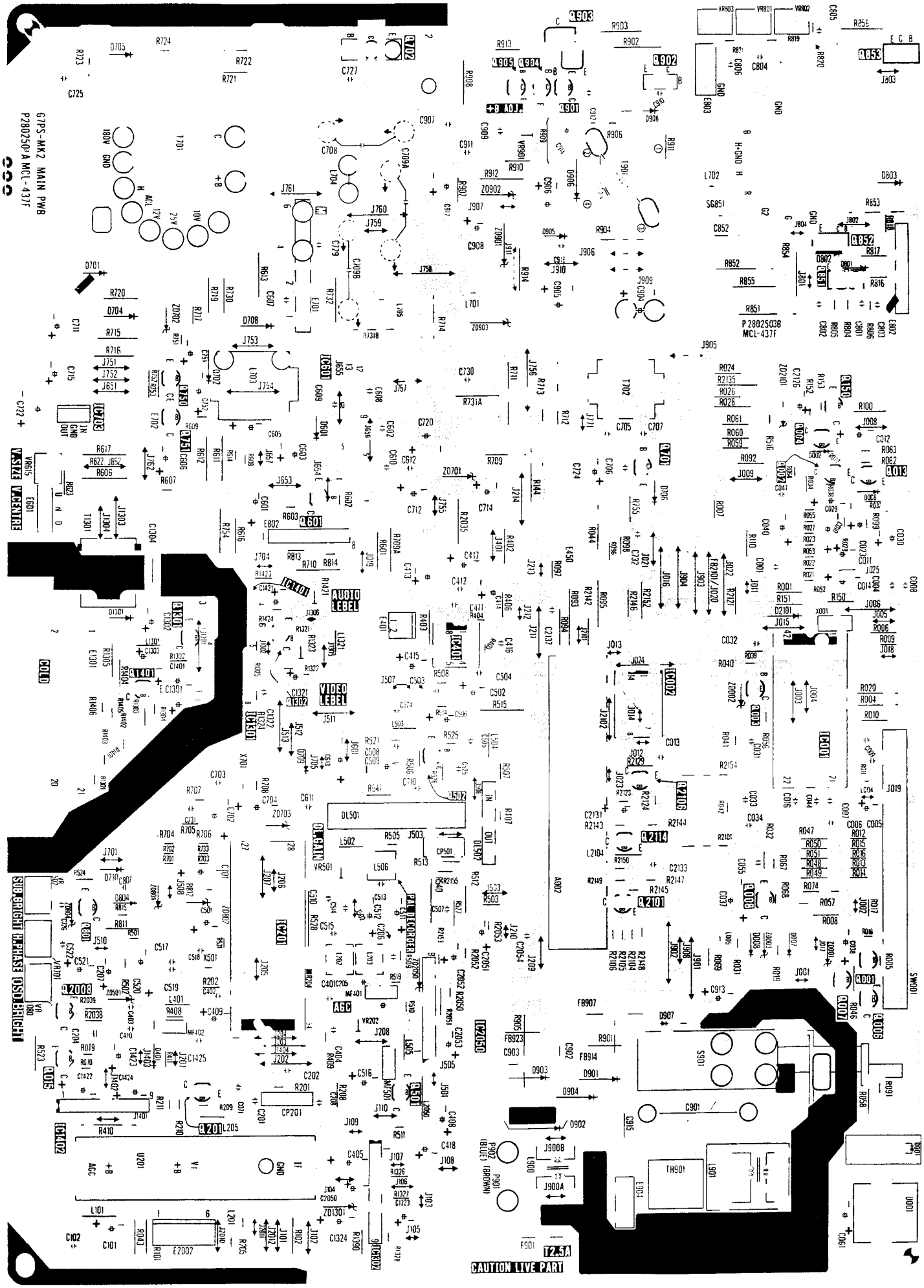


Q702 base
15v p.p.

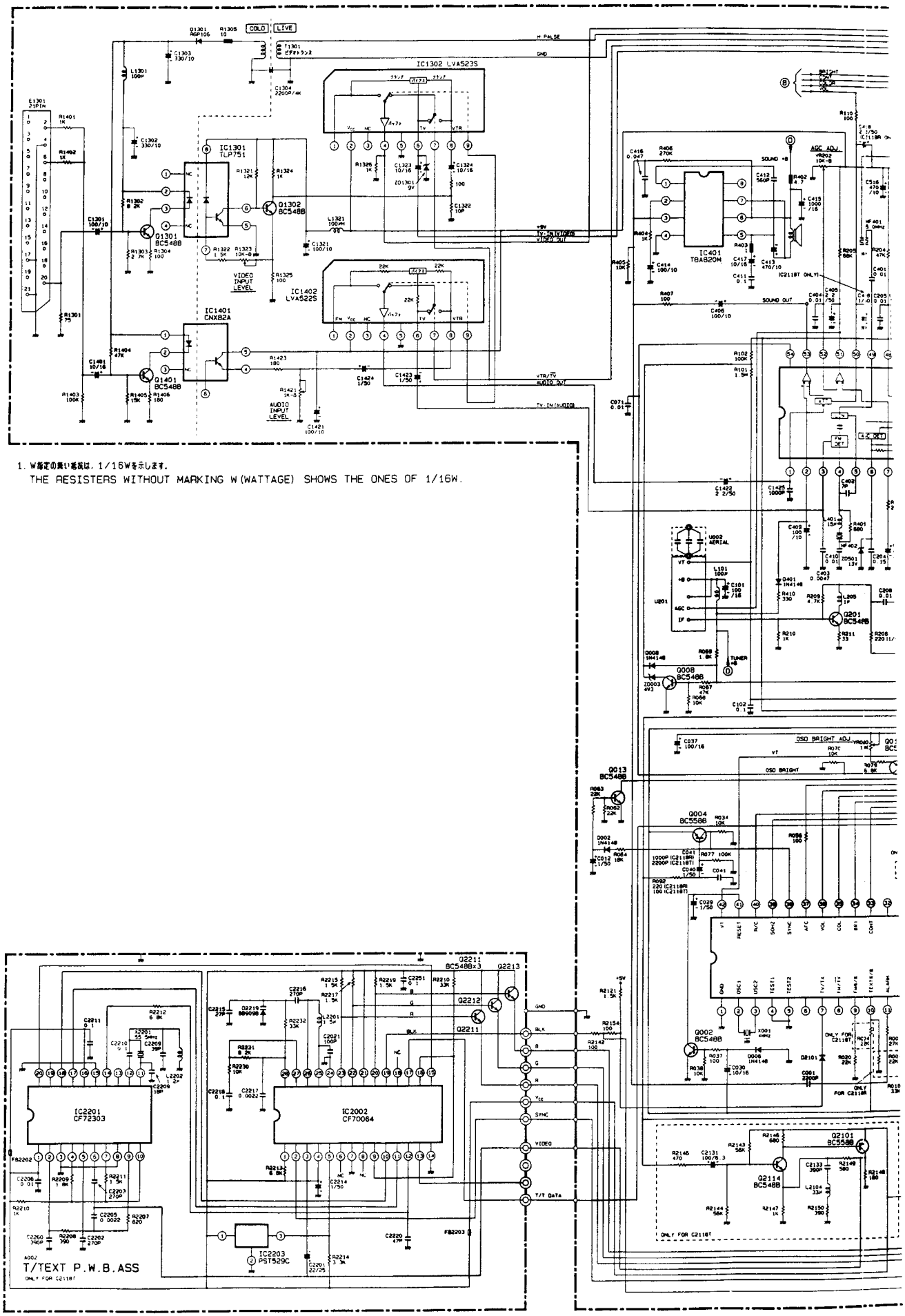
Q701 collector
60v p.p.



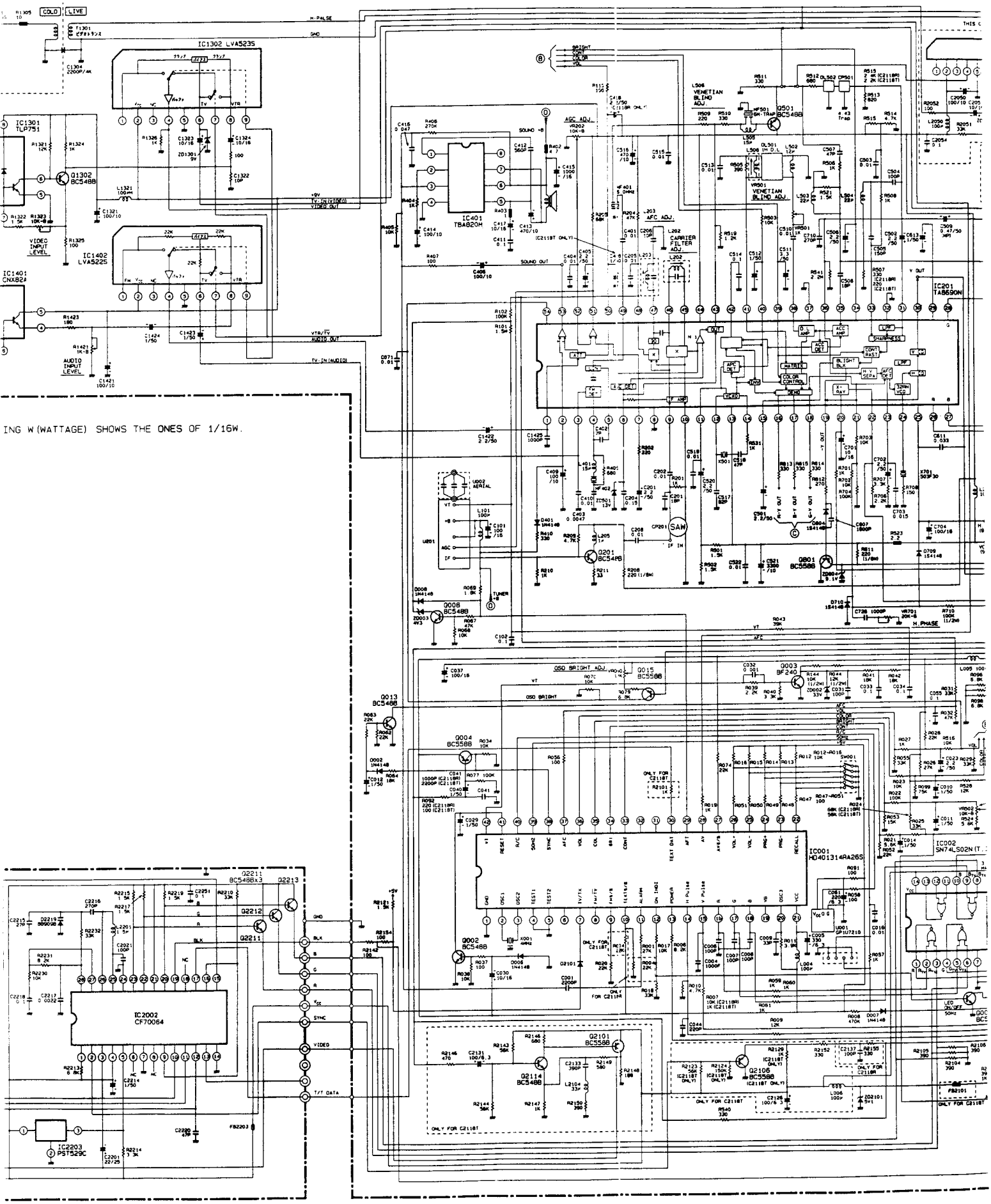
PRINTED



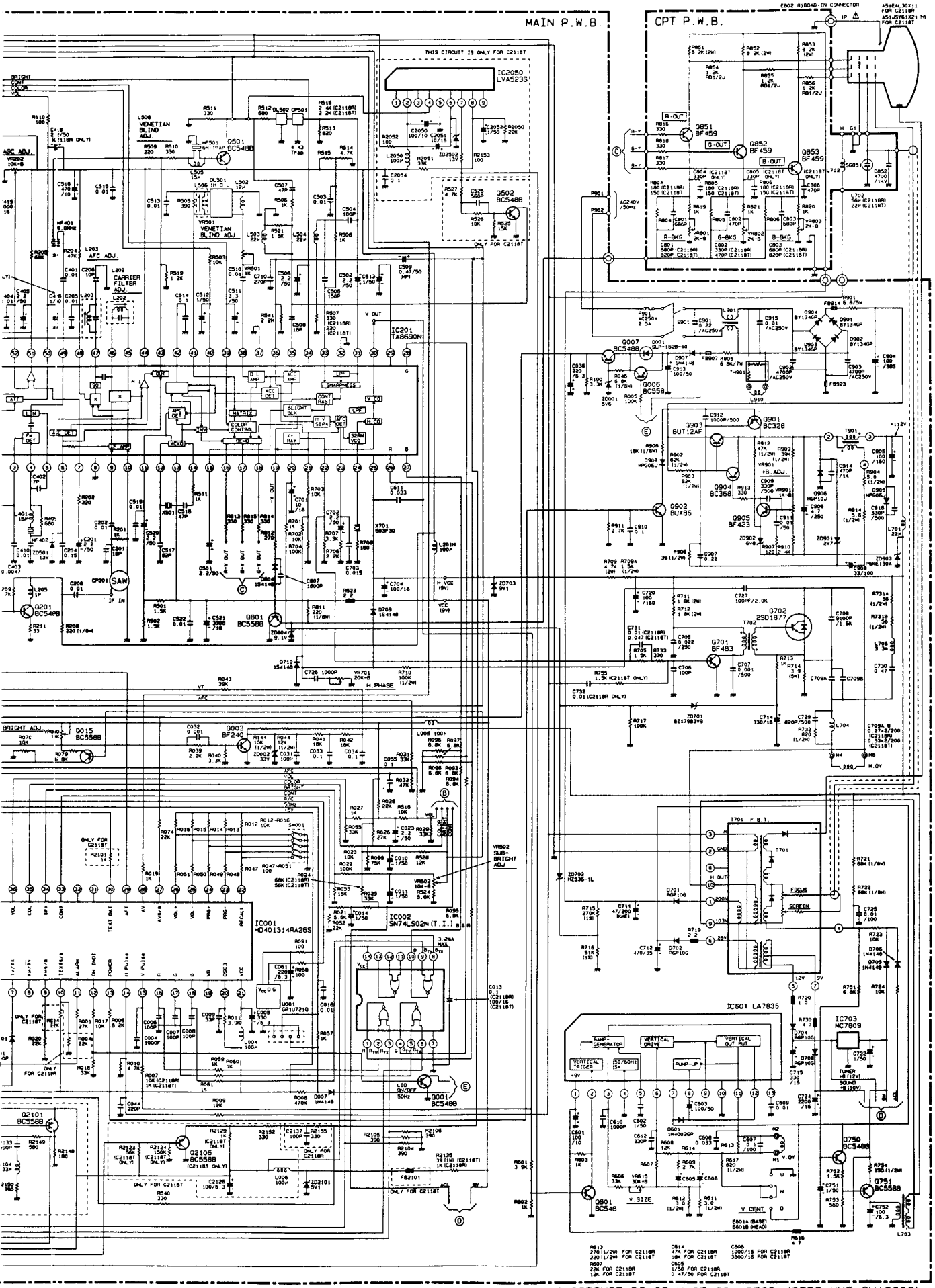
PRINTED CIRCUIT BOARD VIEWED FROM PRINT SIDE



1. W指定の無い抵抗は、1/16Wを示します。
THE RESISTERS WITHOUT MARKING W(WATTAGE) SHOWS THE ONES OF 1/16W.



ING W(WATTAGE) SHOWS THE ONES OF 1/16W.



BASIC CIRCUIT DIAGRAM OF C2118T&R (G7PS MKII CHASSIS)

PRESENTATION PARTS

⚠Back Cover	X261895
⚠CRT Type A51EAL30X11 (C2118R)	T154003
⚠CRT Type A51JSY61X21 (H) (C2118T)	2470601
Hitachi Badge	3792981
Mains Switch Knob	X320991
Operating Guide	X830608
Remote Control Handset (C2118R)	2572281
Remote Control Handset (C2118T)	2572282
Remote Control Window	X425009
Touch Button Block Pad	X310651

MISCELLANEOUS ITEMS

⚠Aerial Terminal	2983422
⚠Degaussing Coil	2274741
⚠Fuse Type 2.5A	E882360
Fuse Holder	2721791
Key Switch Block SW001	2632851
⚠Mains Lead	2745441
⚠Mains Switch	2633391
Speaker	2411532
Tuner Type U743	E710019
U001 Infra Red Amp.Unit	2574741
21 Pin Scart Socket	E826918

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

Resistor Abbreviation	Type
CF	Carbon Film
MO	Metal Oxide
FF	Fusible Film
VR	Variable Control
MF	Metal Film
WW	Wire Wound

Capacitor Abbreviation	Type
C	Ceramic
PF	Plastic Film
MPP	Met. Polypropylene
MPO	Met. Polyester
MPS	Mica/Polystyrene
TA	Tantalum

Parts marked with an asterisk in this list are unique to C2118T models.

Ref No.	Part No.	Value	Type	Tol %	Wattage
R001	0700059M	27K	CF	5	1/16
R004	0700058M	22K	CF	5	1/16
R005	0700067M	100K	CF	5	1/16
R006	0700053M	8K2	CF	5	1/16
R007	0700054M	10K	CF	5	1/16
*R007	0700041M	1K0	CF	5	1/16
R008	R457330	470K	CF	5	1/4
R009	0700055M	12K	CF	5	1/16
R010	0700049M	4K7	CF	5	1/16
R011	0700048M	3K9	CF	5	1/16
R012-17	0700054M	10K	CF	5	1/16
R018	0700061M	33K	CF	5	1/16
R019	0700041M	1K0	CF	5	1/16
R020	0700058M	22K	CF	5	1/16
R021	0700051M	5K6	CF	5	1/16
R022	0700067M	100K	CF	5	1/16
R023	0700054M	10K	CF	5	1/16
R024	0700065M	68K	CF	5	1/16
*R024	0700064M	56K	CF	5	1/16
R025	0700061M	33K	CF	5	1/16
R026	0700059M	27K	CF	5	1/16
R027	0700041M	1K0	CF	5	1/16
R028	0700058M	22K	CF	5	1/16
R029	0700061M	33K	CF	5	1/16
R031	0700061M	33K	CF	5	1/16
R032	0700063M	47K	CF	5	1/16
R034	0700054M	10K	CF	5	1/16
R037	0700027M	100R	CF	5	1/16
R038	0700054M	10K	CF	5	1/16
R039	0700045M	2K2	CF	5	1/16
R040	0700047M	3K3	CF	5	1/16
R041	0700057M	18K	CF	5	1/16
R042	0700057M	18K	CF	5	1/16
R043	0700062M	39K	CF	5	1/16
R044	R142319	12K	CF	5	1/2
R046	0700052M	6K8	CF	5	1/16
R047-51	0700027M	100R	CF	5	1/16
R052	0700058M	22K	CF	5	1/16
R053	0700056M	15K	CF	5	1/16
R055	0700061M	33K	CF	5	1/16
R056	0700027M	100R	CF	5	1/16
R057	0700041M	1K0	CF	5	1/16
R058	0700027M	100R	CF	5	1/16
R059	0700041M	1K0	CF	5	1/16
R060	0700041M	1K0	CF	5	1/16
R061	0700041M	1K0	CF	5	1/16
R062	0700058M	22K	CF	5	1/16
R063	0700058M	22K	CF	5	1/16
R064	0700057M	18K	CF	5	1/16
R067	0700063M	47K	CF	5	1/16
R068	0700054M	10K	CF	5	1/16
R069	0700043M	1K5	CF	5	1/16
R070	0700054M	10K	CF	5	1/16
R074	0700058M	22K	CF	5	1/16
R077	0700067M	100K	CF	5	1/16
R079	0700052M	6K8	CF	5	1/16
VR080	0160225	10K	VR	ON-SCREEN	BRIGHTNESS
R091	0700027M	100R	CF	5	1/16
R092	0700032M	220R	CF	5	1/16
*R092	0700027M	100R	CF	5	1/16
R093-98	0700052M	6K8	CF	5	1/16

Ref No.	Part No.	Value	Type	Tol %	Wattage
R099	0187110M	75K	CF	5	1/16
R100	0700047M	3K3	CF	5	1/16
R101	R165716	1M5	CF	5	1/4
R102	0700067M	100K	CF	5	1/16
R110	0700027M	100R	CF	5	1/16
R144	R140319	10K	CF	5	1/2
R201	0700041M	1K0	CF	5	1/16
VR202	0160215	10K	VR	AGC	CONTROL
R202	0700032M	220R	CF	5	1/16
R204	0700063M	47K	CF	5	1/16
R205	0700065M	68K	CF	5	1/16
R208	R222330	220R	CF	5	1/4
R209	0700049M	4K7	CF	5	1/16
R210	0700041M	1K0	CF	5	1/16
R211	0700021M	33R	CF	5	1/16
⚠ R402	0119687S	4R7	FF	5	1/4
⚠ R403	0119512S	1R0	FF	5	1/4
R404	0700038M	680R	CF	5	1/16
R405	0700054M	10K	CF	5	1/16
R406	R257330	270K	CF	5	1/4
R407	0700027M	100R	CF	5	1/16
R408	0700046M	2K7	CF	5	1/16
R411	0700054M	10K	CF	5	1/16
VR501	0160211	1K0	VR	DELAY	LINE PHASE
R501	0700043M	1K5	CF	5	1/16
VR502	0160225	10K	VR	SUB.	BRIGHTNESS
R502	0700043M	1K5	CF	5	1/16
R503	0700054M	10K	CF	5	1/16
R505	0700035M	390R	CF	5	1/16
R506	0700041M	1K0	CF	5	1/16
R507	0700034M	330R	CF	5	1/16
*R507	0700032M	220R	CF	5	1/16
R508	0700041M	1K0	CF	5	1/16
R509	0700032M	220R	CF	5	1/16
R510	0700034M	330R	CF	5	1/16
R511	0700034M	330R	CF	5	1/16
R512	0700038M	680R	CF	5	1/16
R513	0700039M	820R	CF	5	1/16
R514	0700049M	4K7	CF	5	1/16
R515	0187074M	2K4	CF	5	1/16
*R515	0700045M	2K2	CF	5	1/16
R516	0700054M	10K	CF	5	1/16
R519	0700042M	1K2	CF	5	1/16
R521	0700043M	1K5	CF	5	1/16
⚠ R523	0119505S	2R2	FF	5	1/4
R524	0700051M	5K6	CF	5	1/16
*R525	0700056M	15K	CF	5	1/16
*R526	0700054M	10K	CF	5	1/16
*R527	0700049M	4K7	CF	5	1/16
R528	0700055M	12K	CF	5	1/16
R531	0700041M	1K0	CF	5	1/16
R540	0700034M	330R	CF	5	1/16
R541	R262716	2M2	MF	5	1/4
R601	0700048M	3K9	CF	5	1/16
R602	0700041M	1K0	CF	5	1/16
R603	0700041M	1K0	CF	5	1/16
R606	0700061M	33K	CF	5	1/16
R607	0700058M	22K	CF	5	1/16
*R607	0700055M	12K	CF	5	1/16
R608	0700055M	12K	CF	5	1/16
R609	0700046M	2K7	CF	5	1/16

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	Ref No.	Part No.	Value	Type	Tol %	Wattage
	R611	R300319	3R0	CF	5	1/2
	R612	R300319	3R0	CF	5	1/2
	R613	R227319	270R	CF	5	1/2
	*R613	R222319	220R	CF	5	1/2
	R614	0700063M	47K	CF	5	1/16
	*R614	0700057M	18K	CF	5	1/16
	VR615	0160227	30K	VR	HEIGHT	CONTROL
⚠	R616	0119687S	4R7	FF	5	1/4
	R617	R822319	820R	CF	5	1/2
	VR701	0160226	20K	VR	H. PHASE	CONTROL
	R701	0700041M	1K0	CF	5	1/16
	R702	0700054M	10K	CF	5	1/16
	R703	0700054M	10K	CF	5	1/16
	R704	0700067M	100K	CF	5	1/16
	R705	0700043M	1K5	CF	5	1/16
	R706	0700045M	2K2	CF	5	1/16
	R707	0700047M	3K3	CF	5	1/16
	R708	0700029M	150R	CF	5	1/16
	R709	0110261S	4K7	MO	5	2W
	R709A	R135319	1K5	CF	5	1/2
	R710	R150319	100K	CF	5	1/2
	R711	0110251S	1K8	MO	5	2
	R712	0110251S	1K8	MO	5	2
	R713	0700041M	1K0	CF	5	1/16
	R714	0147530	3R9	WW	10	5
	R715	R254721	240K	MF	1	1/4
	R716	R541721	51K	MF	1	1/4
	R717	0700067M	100K	CF	5	1/16
⚠	R719	0119505S	2R2	FF	5	1/4
⚠	R720	0119512S	1R0	FF	5	1/4
	R721	R648330	68K	CF	5	1/4
	R722	R648330	68K	CF	5	1/4
	R723	0700054M	10K	CF	5	1/16
⚠	R730	0119687S	4R7	FF	5	1/4
	R731A	R516319	56R	CF	5	1/2
	R731B	R516319	56R	CF	5	1/2
	R732	R822319	820R	CF	5	1/2
	R733	0700034M	330R	CF	5	1/16
	R751	0700052M	6K8	CF	5	1/16
	R752	0700043M	1K5	CF	5	1/16
	R753	0700037M	560R	CF	5	1/16
	R754	R125319	150R	CF	5	1/2
	*R755	0700043M	1K5	CF	5	1/16
	VR801	0160222	2K0	VR	RED	BACKGROUND
	VR802	0160222	2K0	VR	GREEN	BACKGROUND
	VR803	0160222	2K0	VR	BLUE	BACKGROUND
	R804	0700031M	180R	CF	5	1/16
	*R804	0700029M	150R	CF	5	1/16
	R805	0700031M	180R	CF	5	1/16
	*R805	0700029M	150R	CF	5	1/16
	R806	0700031M	180R	CF	5	1/16
	*R806	0700029M	150R	CF	5	1/16
	R811	R222330	220R	CF	5	1/14
	R812	0700033M	270R	CF	5	1/16
	R813-18	0700034M	330R	CF	5	1/16
	R819	0700041M	1K0	CF	5	1/16
	R820	0700041M	1K0	CF	5	1/16
	R821	0700041M	1K0	CF	5	1/16
	R851	0110267S	8K2	MO	5	2
	R852	0110267S	8K2	MO	5	2
	R853	0110267S	8K2	MO	5	2
	R854	R132319	1K2	CF	5	1/2
	R855	R132319	1K2	CF	5	1/2
	R856	R132319	1K2	CF	5	1/2
	VR901	0160211	1K0	VR	HT	PRESET
	R901	0144009	6R8	WW	5	5
	R902	R842319	82K	CF	5	1/2
	R903	R842319	82K	CF	5	1/2
	R904	R506319	5R6	CF	5	1/2
	R905	0145045	6K8	WW	5	7
	R906	R148330	18K	CF	5	1/4
	R907	R122330	120R	CF	5	1/4
	R908	R319319	39R	CF	5	1/2
	R909	R349319	39K	CF	5	1/2
	R910	R234330	2K4	CF	5	1/4
	R911	R237330	2K7	CF	5	1/4

	Ref No.	Part No.	Value	Type	Tol %	Wattage
	R912	R447319	47K	CF	5	1/2
	R913	R227330	270R	CF	5	1/4
	R914	R506319	5R6	CF	5	1/2
	R1301	0187038M	75R	CF	5	1/16
	R1302	0700053M	8K2	CF	5	1/16
	R1303	0700046M	2K7	CF	5	1/16
	R1304	0700027M	100R	CF	5	1/16
⚠	R1305	0119514S	10R	FF	5	1/4
	R1321	0700055M	12K	CF	5	1/16
	R1322	0700043M	1K5	CF	5	1/16
	R1323	0160215	10K	VR	VIDEO AMP.	CONTROL
	R1324	0700041M	1K0	CF	5	1/16
	R1325	0700027M	100R	CF	5	1/16
	R1326	0700041M	1K0	CF	5	1/16
	R1390	0700027M	100R	CF	5	1/16
	R1401	0700041M	1K0	CF	5	1/16
	R1402	0700041M	1K0	CF	5	1/16
	R1403	0700067M	100K	CF	5	1/16
	R1404	0700063M	47K	CF	5	1/16
	R1405	0700056M	15K	CF	5	1/16
	R1406	0700031M	180R	CF	5	1/16
	R1421	0160211	1K0	VR	AUDIO GAIN	CONTROL
	R1423	0700031M	180R	CF	5	1/16
	R1424	0700065M	68K	CF	5	1/16
	*R2050	0700058M	22K	CF	5	1/16
	*R2051	0700061M	33K	CF	5	1/16
	*R2052	0700027M	100R	CF	5	1/16
	*R2101	0700041M	1K0	CF	5	1/16
	R2104	0700035M	390R	CF	5	1/16
	R2105	0700035M	390R	CF	5	1/16
	R2106	0700035M	390R	CF	5	1/16
	*R2121	0700043M	1K5	CF	5	1/16
	*R2123	0700064M	56K	CF	5	1/16
	*R2124	0700069M	150K	CF	5	1/16
	*R2129	0700041M	1K0	CF	5	1/16
	R2135	0700041M	1K0	CF	5	1/16
	*R2135	0110111S	39R	MO	5	1
	*R2142	0700027M	100R	CF	5	1/16
	*R2143	0700064M	56K	CF	5	1/16
	*R2144	0700064M	56K	CF	5	1/16
	*R2145	0700038M	680R	CF	5	1/16
	*R2146	0700036M	470R	CF	5	1/16
	*R2147	0700041M	1K0	CF	5	1/16
	*R2148	0700031M	180R	CF	5	1/16
	*R2149	0700038M	680R	CF	5	1/16
	*R2150	0700035M	390R	CF	5	1/16
	*R2152	0700034M	330R	CF	5	1/16
	*R2153	0700027M	100R	CF	5	1/16
	*R2154	0700027M	100R	CF	5	1/16
	*R2155	0700034M	330R	CF	5	1/16
	*R2207	0700039M	820R	CF	5	1/16
	*R2208	0700035M	390R	CF	5	1/16
	*R2209	0700043M	1K5	CF	5	1/16
	*R2210	0700041M	1K0	CF	5	1/16
	*R2211	0700043M	1K5	CF	5	1/16
	*R2212	0700052M	6K8	CF	5	1/16
	*R2213	0700052M	6K8	CF	5	1/16
	*R2214	0700047M	3K3	CF	5	1/16
	*R2215	0700043M	1K5	CF	5	1/16
	*R2217	0700043M	1K5	CF	5	1/16
	*R2219	0700043M	1K5	CF	5	1/16
	*R2230	0700054M	10K	CF	5	1/16
	*R2231	0700053M	8K2	CF	5	1/16
	*R2232	0700061M	33K	CF	5	1/16
	*R2240	0700061M	33K	CF	5	1/16

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Ref No.	Part No.	Value	Type	Tol %	Voltage
C001	0244105R	2n2	C	10	50
C004	0890087R	1n0	C	-	50
C005	0800064R	330µ	EL	-	6V3
C006	0890074R	100p	C	5	50
C007	0890074R	100p	C	5	50
C008	0890074R	100p	C	5	50
C009	0890121R	33p	C	5	50
C010	0800003R	1µ0	EL	-	50
C011	0800003R	1µ0	EL	-	50
C012	0800003R	1µ0	EL	-	50
C013	0880057R	100n	PF	10	50
*C013	0800047R	100µ	EL	-	6V3
C014	0800003R	1µ0	EL	-	50
C016	0880044R	10n	PF	10	50
C023	0800005R	2µ2	EL	-	50
C029	0800003R	1µ0	EL	-	50
C030	0800015R	10µ	EL	-	16
C031	0246464R	100p	C	5	50
C032	0890087R	1n0	C	-	50
C033	0880057R	100n	PF	10	50
C034	0880057R	100n	PF	10	50
C037	0800048R	100µ	EL	-	10
C038	0800056R	220µ	EL	-	6V3
C040	0800003R	1µ0	EL	-	50
C041	0890087R	1n0	C	-	50
*C041	0890092R	2n2	C	10	50
C044	0890078R	220p	C	5	50
C055	0880057R	100n	PF	10	50
C061	0800056R	220µ	EL	-	6V3
C071	0880044R	10n	PF	10	50
C101	0800049R	100µ	EL	-	16
C102	0880057R	100n	PF	10	50
C201	0890064R	18p	C	5	50
C202	0880044R	10n	PF	10	50
C204	0880059R	150n	PF	10	50
C205	0880044R	10n	PF	10	50
C206	0890114R	10p	C	-	50
C207	0800005R	2µ2	EL	-	50
C208	0244171R	10n	C	10	50
C401	0880044R	10n	PF	10	50
C402	0890117R	18p	C	5	50
C403	0890096R	4n7	C	20	50
C404	0880044R	10n	PF	10	50
C405	0800005R	2µ2	EL	-	50
C406	0800048R	100µ	EL	-	10
C409	0800023R	22µ	EL	-	16
C410	0244171R	10n	C	10	50
C411	0880057R	100n	PF	10	50
C412	0890084R	560P	C	10	50
C413	0800073R	470µ	EL	-	10
C414	0800015R	10µ	EL	-	16
C415	0800082	1000µ	EL	-	16
C416	C447715	47n	MPO	10	63
C417	0800015R	10µ	EL	-	16
C418	0800005R	2µ2	EL	-	50
C501	0800005R	2µ2	EL	-	50
C502	0800005R	2µ2	EL	-	50
C503	0880044R	10n	PF	10	50
C504	0890074R	100p	C	5	50
C505	0890076R	150p	C	10	50
C506	0800005R	2µ2	EL	-	50
C507	0890123R	47p	C	5	50
C508	0890117R	18p	C	5	50
C509	0800001R	0µ47	EL	-	50
C510	0880044R	10n	PF	10	50
C511	0800007R	3µ3	EL	-	50
C512	0800003R	1µ0	EL	-	50
C513	0880044R	10n	PF	10	50
C514	0880057R	100n	PF	10	50
C515	0880044R	10p	PF	10	50
C516	0800073R	470µ	EL	-	10
C517	0890073R	82p	C	5	50
C518	0890121R	33p	C	5	50
C519	0880044R	10n	PF	10	50
C520	0800005R	2µ2	EL	-	50
C521	0800089	3300µ	EL	-	10

Ref No.	Part No.	Value	Type	Tol %	Voltage
C522	0880044R	10n	PF	10	50
*C525	0890084R	560p	C	10	50
C601	0800048R	100µ	EL	-	10
C602	0276729	1µ0	PF	5	50
C603	0800053R	100µ	EL	-	50
C605	0800003R	1µ0	EL	-	50
*C605	C457715	470n	MPO	10	63
C606	0800082	1000µ	EL	-	16
*C606	0800372	3300µ	EL	-	16
C607	0279693R	100n	PF	10	100
C608	0880051R	33n	PF	10	50
C609	0880044R	10n	PF	10	50
C610	0890087R	1n0	C	-	50
C611	0880051R	33n	PF	10	50
C612	0890081R	330p	C	10	50
C613	0800003R	1µ0	EL	-	50
C701	0800015R	10µ	EL	-	16
C702	0800005R	2µ2	EL	-	50
C703	0880046R	15n	PF	10	50
C704	0800049R	100µ	EL	-	16
C705	C242710	22n	MPO	10	250
C706	0890074R	100p	C	5	50
C707	0244501R	1n0	C	10	500
C708	0299723	9n1	PF	5	2K5
C708B	0299931	270n	PF	10	200
C709A	0299931	270n	PF	10	200
*C709A	0299932	330n	PF	10	200
C709B	0299931	270n	PF	10	200
*C709B	0299932	330n	PF	10	200
C710	0890079R	270p	C	10	50
C711	0255031	47µ	EL	-	200
C712	0800076	470µ	EL	-	31V5
C714	0800066R	330µ	EL	-	16
C715	0800066R	330µ	EL	-	16
C720	0259152	100µ	EL	-	160
C722	0800003R	1µ0	EL	-	50
C724	0800087	2200µ	EL	-	16
C725	0279687R	10n	PF	10	100
C726	0890087R	1n0	C	-	50
C727	0246344	100p	C	10	2K0
C729	0243512R	820p	C	10	500
C730	0276673	470n	PF	10	50
C731	0880044R	10n	PF	10	50
*C731	0880053R	47n	PF	10	50
*C732	0880044R	10n	PF	10	50
C751	0800003R	1µ0	EL	-	50
C752	0800047R	100µ	EL	-	6V3
C801	0890085R	680p	C	-	50
*C801	0890086R	820p	C	10	50
C802	0890081R	330p	C	10	50
*C802	0890083R	470p	C	10	50
C803	0890085R	680p	C	-	50
*C803	0890086R	820p	C	10	50
*C804	0890081R	330p	C	10	50
*C805	0890081R	330p	C	10	50
*C806	0890083R	470p	C	10	50
C807	0244104R	1n8	C	10	50
C852	0245612	4n7	C	10	1K0
C901	0279698	220n	PF	20	250
⚠ C902	0249395	4n7	C	10	500
⚠ C903	0249395	4n7	C	10	500
C904	0284231	100µ	EL	-	400
C905	0253960	100µ	EL	-	160
C906	0253971	4µ7	EL	-	250
C907	0880062R	220n	PF	10	50
C908	0800037	33µ	EL	-	100
C909	0243507R	330p	C	10	500
C910	0880016R	100n	PF	10	50
C911	C333715	3n3	MPO	10	63
C912	0244501R	1n0	C	10	500
C913	0800053R	100µ	EL	-	50
C914	0245605	470p	C	10	1K0
⚠ C915	0249396	10n	C	10	500
C916	0243507R	330p	C	10	500
C1301	0800048R	100µ	EL	-	10
C1302	0800065R	330µ	EL	-	10

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Ref No.	Part No.	Value	Type	Tol %	Voltage
C1303	0800065R	330µ	EL	-	10
⚠ C1304	0247974	2n2	C	-	4K0
C1321	0800048R	100µ	EL	-	10
C1322	0890114R	10p	C	-	50
C1323	0800015R	10µ	EL	-	16
C1324	0800015R	10µ	EL	-	16
C1401	0800015R	10µ	EL	-	16
C1421	0800048R	100µ	EL	-	10
C1422	0800005R	2µ2	EL	-	50
C1423	0800003R	1µ0	EL	-	50
C1424	0800003R	1µ0	EL	-	50
C1425	0890087R	1n0	C	-	50
C2050	0800048R	100µ	EL	-	10
*C2051	0800015R	10µ	EL	-	16
*C2052	0800003R	1µ0	EL	-	50
*C2053	0800048R	100µ	EL	-	10
*C2054	0880057R	100n	PF	10	50
*C2126	0800047R	100µ	EL	-	6V3
*C2131	0800047R	100µ	EL	-	6V3
*C2133	0890082R	390p	C	-	50
*C2137	0890074R	100p	C	5	50
*C2201	0800129R	22µ	EL	-	25
*C2202	0890027M	270p	C	10	50
*C2203	0890027M	270p	C	10	50
*C2205	0880035R	2n2	PF	10	50
*C2206	0880044R	10n	PF	10	50
*C2207	0890012M	18p	C	5	50
*C2209	0890016M	39p	C	5	50
*C2210	0880031R	1n0	PF	10	50
*C2211	0890035M	1n0	C	10	50
*C2214	0800143R	100µ	EL	-	6V3
*C2215	0890014M	27p	C	5	50
*C2216	0890027M	270p	C	10	50
*C2217	0880035R	2n2	PF	10	50
*C2218	C150715	100n	MPO	10	63
*C2220	0890017M	47p	C	5	50
*C2221	0890022M	100p	C	10	50
*C2251	C150715	100n	MPO	10	63
*C2260	0890082R	390p	C	-	50

Ref No.	Part No.	Value	Type	Tol %	Voltage

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Ref. No.	Part No.	Description
IC001	2383514	HD401314RA26S
IC002	2361201	SN74LS02N
IC201	2003161	TA8690N
IC401	T900402	TBA820M
IC601	2381662	LA7835
IC703	T900489	MC7809
⚠ IC1301	2386201	TLP751
IC1302	2000281	LVA523S
⚠ IC1401	2917781	CNX82A
IC1402	2383341	LVA522S
*IC2050	2000281	LVA523S
*IC2201	T900478	CF72303
*IC2202	2009461	CF70064
*IC2203	2009401R	PST529C
Q001	T631275	BC548B
Q002	T631275	BC548B
Q003	T633134	BF240
Q004	T631276	BC558B
Q006	T631276	BC558B
Q007	T631275	BC548B
Q008	T631275	BC548B
Q013	T631275	BC548B
Q015	T631276	BC558B
Q201	T631275	BC548B
Q501	T631275	BC548B
*Q502	T631275	BC548B
Q601	T631275	BC548B
Q701	T633140	BF483
Q702	2327502	2SD1877
Q750	T631275	BC548B
Q751	T631276	BC558B
Q801	T631276	BC558B
Q851	T633137	BF459
Q852	T633137	BF459
Q853	T633137	BF459
Q901	T631290	BC328
Q902	T636039	BUX86
Q903	2314791	BUT12AF
Q904	T631291	BC368
Q905	T633138	BF423
Q1301	T631275	BC548B
Q1302	T631275	BC548B
Q1401	T631275	BC548B
*Q2101	T631276	BC558B
*Q2106	T631276	BC558B
*Q2114	T631275	BC548B
*Q2211	T631275	BC548B
*Q2212	T631275	BC548B
*Q2213	T631275	BC548B
D001	2338991	SLP-162B-60
D002	T531053	IN4148
D006	T531053	IN4148
D007	T531053	IN4148
D008	T531053	IN4148
D402	T531053	IN4148
D601	T531063	IN4002
D701	2343941M	RGP10G
D702	2343941M	RGP10G
D704	2343941M	RGP10G
D705	T531053	IN4148
D706	T531053	IN4148
D708	2343941M	RGP10G
D709	T531053	IN4148
D710	T531053	IN4148
D804	T531053	IN4148
D901-04	2344111M	BY134GP
D905	2343963M	MPG06J
D906	2343942M	RGP10J
D907	T531053	IN4148
D908	2343963M	MPG06J
D1301	2343941M	RGP10G

Ref. No.	Part No.	Description
*D2101	T531053	IN4148
*D2219	2345251M	BB909B
Z001	T536224	BZX79B5V6
ZD002	2335991M	HZT33-02TA
ZD003	T536213	4V3 ZENER 500mW
ZD501	T536181	13V ZENER 500mW
ZD701	T536221	BZX79B3V9
ZD702	2339251M	HZS36-ILT
ZD703	T536229	BZX79B9V1
ZD804	T536229	BZX79B9V1
ZD901	T536190	2V7 ZENER 500mW
ZD902	T536175	6V8 ZENER 500mW
ZD903	2344121M	P6KE130A
ZD1301	T536229	BZX79B9V1
*ZD2050	T536229	BZX79B9V1
ZD2101	T536201	BZX79B5V1
L004	2123781R	100μH FILTER COIL
L005	2123781R	100μH FILTER COIL
*L006	2123781R	100μH FILTER COIL
L101	2122956M	100μH AXIAL COIL
L201	2123781R	100μH FILTER COIL
L202	2123683	HIGH FREQ.TUNING COIL
L203	2123684	HIGH FREQ.TUNING COIL
L205	2122929M	1μH AXIAL COIL
L401	2122945M	15μH AXIAL COIL
L502	2122944M	12μH AXIAL COIL
L503	2122947M	22μH AXIAL COIL
L504	2122947M	22μH AXIAL COIL
L505	2122945M	15μH AXIAL COIL
L506	2143193	DELAY LINE PHASE
L701	2123331	22μH FILTER COIL
L702	2122093	56μH FIXED INDUCTOR
*L702	2122094	22μH FIXED INDUCTOR
L703	2274772	VARIABLE INDUCTOR
L704	2164541	LINEARITY COIL
L705	2123728R	3.3μH COIL
L901	2124531	LINE FILTER COIL
L1301	2122956M	100μH AXIAL COIL
L1321	2122956M	100μH AXIAL COIL
L2050	2122956M	100μH AXIAL COIL
*L2104	2122949M	33μH AXIAL COIL
*L2201	2123092M	1.5μH AXIAL COIL
*L2202	2123091M	1.2μH AXIAL COIL
⚠ T701	2435066	FLYBACK TRANSFORMER
T702	2260221	H.DRIVE TRANSFORMER
T901	2274731	SWITCHING TRANSFORMER
⚠ T1301	2274901	ISOLATING TRANSFORMER
CRYSTALS, DELAY LINES, FILTERS etc.		
CP201	2305341	SAW FILTER F1045AK
CP501	2150311	4.43MHz TRAP
DL501	L410134	CHROMINANCE DELAY LINE
DL502	2165902	LUMINANCE DELAY LINE
MF401	2142603	6MHz CERAMIC FILTER
MF402	2792161	CERAMIC DISCRIMINATOR
MF501	2142244	6MHz CERAMIC TRAP
SG851	2340037	SPARK GAP
⚠ TH901	E441034	THERMISTOR
X001	2164791	4MHz CERAMIC RESONATOR
X501	2792151	4.43MHz CRYSTAL
X701	2168201	CERAMIC OSCILLATOR
*X2201	2168231	55.5MHz CRYSTAL